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THE

LONDON JOURNAL

OF

Arts and Sciences;

CONTAINING

REPORTS OF ALL NEW PATENTS,

WITH A

DESCRIPTION OF THEIR RESPECTIVE PRINCIPLES AND PROPERTIES:

ALSO,

Original Communications

ON SUBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY;

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

Practical Mechanics.

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AND W. NEWTON, CHANCERY-LANE.

1821.

LONDON:

SHACKELL AND ARROWSMITH, JOHNSON'S COURT.

TO THE PUBLIC.

We have now closed our second volume, and trust that our readers are convinced no efforts on our part have been wanting to make this work what it is chiefly designed to be, a Journal of the present state of the Arts, and the collateral Sciences.

On the solicitation of many respectable friends and subscribers, we have determined for the future, instead of publishing our number every two months, to publish it *monthly*, in order that, by these means, the earliest information may be communicated to the public, and to make it, as we are assured it must be, more acceptable to our readers.

The thirteenth number, therefore, of the London Journal of Arts and Sciences, and the *first* of the Third Volume, will appear on the First of January next, and the subsequent numbers will be published regularly on the First day of each succeeding month, making *two* volumes annually.

In consequence of this arrangement, it has been necessary to make a difference in the quantity and price. Instead of three shillings and sixpence, heretofore charged for each number, the future price will be *two shillings and sixpence;* there being, of course, a proper portion of letterpress and plates. This alteration, we doubt not, will be approved.

Of our own efforts, after the publication of two volumes, it is scarcely necessary to speak. But in the new arrangement, we pledge ourselves to equal exertions with the past; and, indeed, we venture to presume, that every number of the LONDON JOURNAL OF ARTS from its commencement, has evinced a progressive improvement: and that progression it will be still our chief aim to foster and promote.

For the patronage which this work has already received, we beg leave to return our best thanks; and confidently look forward to an extension of that support to which we hope and believe we are honourably and fairly entitled.

November 29th, 1821.

Captn. Phillips's, Capstan.

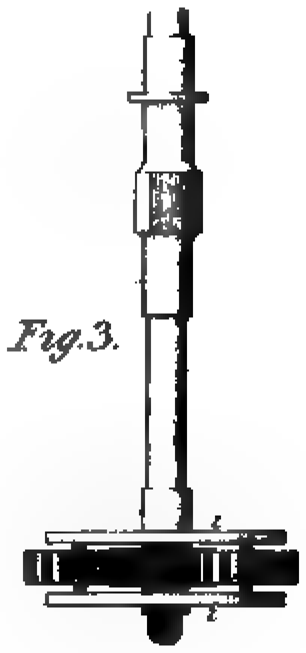


Fig. 3.

ig. 4

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. VII.

Recent Patents.

To Captain Charles Phillips, *R. N. for certain Improvements on Capstans.*

The evident want of power in the usual mode of weighing anchors, led the inventor to devise a means of overcoming that difficulty; and, aware that mechanical power might be obtained in many ways, his principal study has been simplicity, and the adaptation of such means as could be used with the greatest convenience at sea, and which mariners in the darkest night could not, by any possibility, mistake in applying.

In Plate 1, Fig. I, is a section of a capstan upon the improved principle, for a single decked vessel, as a sloop of war, or a merchant's ship. Fig. 2, is a view of a double capstan as used on board men of war and East Indiamen, with the improvements, and which will be more distinctly seen, in fig, 3, a representation of the spindle

and wheels removed from the capstan; and, fig. 4, a horizontal view of the wheels and pinions, by the action of which the power is gained. The respective letters refer to the same parts respectively in every figure; *a*, is the drum head fixed upon the square of the spindle *b*, and which are both made to revolve horizontally by the manual power exerted against the levers or capstan bars *c*, *c*, fitting into the mortices in the drum head as usual. In ordinary capstans, this drum head is firmly attached to the barrel, *d*, and revolves with it; but in this improved capstan, their connection is formed by the descent of the bolts, *e*, *e*, which falling into sockets in the barrel or whelps, of the capstan fastens them together; or when the bolts are withdrawn from the sockets, the drum head with the spindle moves round, leaving the capstan stationary for the reasons which will be hereafter explained.

At the lower part of the spindle, *b*, is affixed a spur-wheel, *f*, which revolves with the spindle and drum head, and gives motion to the three planet wheels, *g*, *g*, *g*, moving round and within the rim wheel, *h*, seen particularly in fig. 4. The pivots of the axes of these wheels are supported in the two plates, *i*, *i*, forming a frame or carriage to hold them, which frame, *i*, *i*, turns loosely upon the spindle, *b*; and as the rim wheel, *h*, is stationary, the spur wheel or sun wheel, *f*, drives round the planet wheels, *g*, *g*, *g*, and consequently their carriage or the plates *i*, *i*, revolve with a diminished velocity, by which an increased power is obtained. In order therefore to communicate the power thus gained to the capstan, and afford the increased means of coiling the cable and drawing in or weighing the anchor, a connection is formed between the carriage *i*, and the capstan, which is done by letting fall the lower bolts *k*, *k*, through

the pall head into mortices in the plate or carriage *i*, (see the dotted lines in fig. 2,) by which the slower motion of the said plate or carriage *i*, is communicated to the capstan, and, of course, an increase of power in the same ratio; observing that the upper bolts *e*, *e*, are, under these circumstances, withdrawn from the sockets; and hence the revolution of the drum head is unconnected with that of the barrel of the capstan, except through the agency of the lower bolts uniting it with the carriage *i*, as described.

In order to keep the works of the single capstan fig. 1, dry, they are placed below deck; and as the bolts *k*, *k*, in that figure, cannot fall into the plate or carriage *i*, as described and shewn by dots in figure 2, by reason of the partners *j*, *j*, and the deck intervening, it is in this construction therefore found necessary to connect the plate or carriage *i*, with another plate *l*, above deck; this is done by means of the cylinder *m*, which, like the carriage working loosely round the pinion, has square ends fitting into the two plates *l*, and *i*, connecting the carriage *i*, and the upper plate *l*, together, so that by the lower bolts *k*, *k*, falling into the mortices in the upper plate *l*, the barrel of the capstan becomes united to the work below, and receives, by their action, the increased power as before explained.

In the double capstan fig. 2, the works are placed somewhat differently to fig. 1, as they stand on the same deck with the lower capstan and immediately under it. The two capstans are contrived to work either together or separately, as common capstans; or by means of the improved apparatus, with an increased power or an accelerated velocity. The connection of the lower capstan to the spindle is by means of a clutch box *n*, which falls into a hexagonal part of the spindle, where the

two capstans are intended to be united. This clutch box is raised and lowered by means of its connection with the ends of the levers *o*, *o*, having their fulcrums upon standards *p*, *p*; at the reverse ends of these levers are chains suspending the lower bolts *k*, *k*; so that by the clutch box *n*, being lowered as in fig. 2, the bolts *k*, *k*, at the same time rise, disuniting the lower capstan from the wheels, and hence the apparatus becomes a double capstan of the ordinary construction, the clutch box locks between the catches or the trundle-head, connecting the spindle and lower capstan together; and the sun and planet wheels run round without any communication with the lower capstan, and of course without giving any increased power.

When difficulty in purchasing arises from want of hands, the bolts *k*, *k*, are let down, which connect the barrel of the capstan to the planet wheel carriage *i*, *i*, as above described, and set the barrel free of the spindle, so that, as the lower capstan thus connected turns slower, it affords an increased power.

To increase the velocity, let the warp be made fast to the upper capstan upon the quarter-deck, the connection remaining as last described, and the heaving on at the lower capstan upon the main-deck, when the upper capstan will revolve with an accelerated velocity.

The shifting of the several powers, as must be evident by the description, occupies but a minute of time, and in its use, should all the works break, the capstans will be still as perfect as those of the common construction. It is thus evident that no greater strain can be applied to the works than the force of the men: the cogs being calculated to bear considerably more than twice the power which can be used, there is scarcely a possibility of the apparatus breaking. There is how-

ever a circumstance to be noticed, (viz.) the pressure of the wind bearing against the masts and the rolling of the vessel, which sometimes causes the decks to bend, and hence the spindles getting out of the perpendicular would cause the geer to cross; to obviate this inconvenience the rim wheel *h*, is hung in gimbles, so as to give way, and allow the play of one deck from the other without interfering with the works; so that, should the spindle incline, the rim wheel will incline over with it, and they will always keep at right angles to each other. There are also pauls and catches applied at every three inches to the periphery of the capstan at the bottom of the whelps; see *q*, *q*, fig. 2; so that, under any circumstances of strain or impediment to the progress of the capstan, these pauls will take and prevent the mischief which has sometimes occurred by the heaving of the men being overpowered and the capstan recoiling.

From the foregoing description it will be seen, that this improved capstan possesses advantages which are of the first consequence to the Navy in general, and the safety of a ship; as, should she get on shore upon the height of a spring tide, when although water borne on the succeeding tide yet not floating, she must remain there for want of power to heave her off; but, by this apparatus, she may, with a few hands, be relieved from inevitable destruction. Saving a wind to pursue a voyage, obtaining an anchor which would otherwise be lost, rendering the men efficient when reduced or weakened by sickness, and many other situations on ship board, are those in which this apparatus may be found inestimable; but the testimony of its worth bestowed by the Lords Commissioners of the Admiralty, after a trial on board H. M. S. Active, and the Honourable the Board

of Directors of the East India Company, preclude the necessity of farther detailing its advantages.

Inrolled, March, 1820.

To WILLIAM HARVEY, *of Belper, in the County of Derby, for certain Improvements in the Manufacture of Ropes and Belts by Machinery, and also Improvements in the said Machinery.*

THIS invention consists of a mode of connecting several ropes or lays of rope together, for the purpose of forming flat ropes or bands, to be used in raising coal or other minerals up the shafts of mines, and other purposes where great strength is required; and also for forming square ropes to be used as cables or for the standing rigging of ships.

The improved mode of uniting the several lays of rope, is by means of bolts or pins of copper, brass, or other metal, least likely to corrode or rust, (iron being particularly excepted;) which bolts are passed through the respective ropes placed side by side and riveted at their extremities; by which the several lays become connected and form a flat belt or band.

In order to pierce holes through these lays of rope correctly for the reception of the pins or bolts, a carriage upon rollers is constructed, having a table to receive the ropes and a vice to confine them in a flat position. The several lengths of rope intended to be bolted together are then extended along the rope walk, and the carriage brought under them, so that they may rest upon the table. The vice is then screwed up, by which the lays of rope are compressed laterally together, and a winch turned connected with the vice, which sends forward a bodkin

or piercer through the ropes and produces a hole for the reception of the bolt or pin.

On the bodkin being withdrawn and the vice unscrewed, the carriage is moved backward or forward as many inches as the connecting bolts, or pins are intended to be placed asunder and screwed up again for the purpose of making another hole; the pin is then put through the hole by hand and rivetted. The holes may be pierced by means of a lever instead of the winch before mentioned, or by several other modes; these modes form no part of the patent, but are described for the better understanding of the process, nor is the invention of connecting several ropes or lays of rope together in a lateral position claimed, but simply the means of connecting them, (viz.) by bolts or pins of copper brass or other metal, which may be least likely to rust. This mode of forming flat bands or square ropes for the purposes above mentioned, constitutes the improvement claimed by the patentee.

Inrolled, December, 1820.

To THOMAS HANCOCK, *of Pulteney Street, Golden Square, London, for a Discovery that by the application of a certain Material to certain Articles of Dress, the same may be rendered more Elastic.*

THE material used is *Caoutchouc* (Indian Rubber) cut into strips of a convenient length and thickness, according to the circumstance under which it is intended to be applied, and the degree of elasticity which may be found necessary. If the Indian rubber be not of the best quality, or the spring be not required very strong,

then the strips are prepared by steeping them in hot water to prevent them from cracking on the edges. But when the Indian rubber is of the best quality and the spring is required to be strong, it is to be used without such preparation. Springs of this material are applicable to gloves, by forming a case or pipe in the wrist of the glove and passing a strip of the Indian rubber through the pipe; the wrist of the glove must then be gathered up, and the ends of the elastic strip fastened together so as to form a ring considerably smaller than the opening of the glove, but which expands by the introduction of the hand, and contracts again tightly round the wrist when the hand has passed into the glove.

These springs may be applied in a similar manner to any other article of dress where tightness and elasticity are required: as, to waiscoats, wristbands, cuffs of sleeves, kneebands, garters, the openings of pockets, braces, and also to* wigs, false curls, and fronts, to keep them tight on the head; and to pocket-books and purses instead of wire springs; to stays and various other parts of female apparel; to the binding of shoes, to riding-belts, stiffeners of neck-cloths, and a great variety of other uses.

Inrolled, August, 1820.

To John Winter, *of Acton, in the County of Middlesex, Esq. for certain Improvements in Chimney Caps, and the application thereof.*

This improvement consists of a conical cap or hood to be placed over the top of the chimney, which is to be so

* A Patent for elastic wigs upon this principle was granted about forty years ago.

suspended as to vibrate by the pressure of the wind. The cap must be wider at the bottom than the chimney pot, and hung some distance below the chimney top, in order to allow the smoke to discharge itself without being impeded by the downward pressure of the wind. This cap may be made of metal (copper is preferable,) or earthenware, and is to be attached by means of a vertical rod passing up the middle of the chimney-pot, upon which the apex of the conical cap is to rest, with a small pin passing through a hole in the top of the cap, and a button on the outside to prevent its being blown off. Thus suspended, whenever the wind beats powerfully against the chimney-top, this conical cap will be forced out of its horizontal position, that part which meets the wind, lying close and shielding the chimney-top, and the opposite side rising to give space for the discharge of the smoke.

Inrolled, January, 1821.

To John Birkinshaw, *of Bedlington Iron Works, Durham, for an Improvement in the construction of Malleable Iron Rails, to be used in Rail Roads, whereby the cost is reduced, and the expense of repairs of broken rails entirely saved.*

This invention consists in the adaptation of *wrought iron bars* or rails of a peculiar form for rail roads or rail ways, instead of cast iron rails as heretofore. It is stated that, from the brittle nature of cast iron, it has been hitherto found by experience necessary to make the bars of a rail road sufficiently strong to bear at least six times the weight intended to pass over them, from which circumstance their original cost is considerably aug-

mented: for if light rails of cast iron are used, the necessity of frequent reparation, entailed a heavy expence upon the proprietors.

To obviate these objections, the patentee has invented a bar to be made of wrought or malleable iron, the original cost of which will be less than the ordinary cost of iron bars or rails, and at the same time will be found to require little if any reparation in the course of many years use.

These rails or bars are formed as prisms, though their sides need not be flat, but may be curved. They are to be planted in standards, supporting blocks or rests, upon basements or sleepers with the edge downwards. The upper surface upon which the wheels of the carriages are to run, may be slightly convex in order to reduce the friction of the wheels in passing. The prism or wedge-formed bar is proposed, because the strength of the rail is in proportion to the square of its breadth and depth, hence this form possesses all the stability of a cube equal to its square with only half the quantity of metal. Sufficient strength, however, may be still retained and the weight of the metal farther reduced, by forming the bars with concave sides, as shewn at fig. 1, plate I. a section of that form of bar particularly recommended, though the wedge or prism form, in all its varieties, in wrought or malleable iron, is claimed as being the principle upon which the patent right is founded.

The mode of forming these malleable iron rails, is by passing bars of iron, when sufficiently heated, through rollers having grooves or indentations upon their periphery, agreeable to the intended shape of the bar to be produced. This method is recommended as the most eligible mode of forming the rails, but is not claimed as any part of the patent.

The advantages of these improved *wrought iron rails* are, first, on the score of economy, as above explained; secondly, that the respective rails may be made of considerable length (18 feet is suggested) by which the inconvenience of so many joints is reduced, and, consequently, the shocks to which the carriages are subject in passing over them: and, thirdly, in the case by which their ends may be welded together as they are laid down, so as to form one uninterrupted rail from beginning to end.

Inrolled, December, 1820.

To JOHN VALLANCE, *of Brighton, Sussex, for a method and apparatus for packing and preserving Hops.*

THE object of this patentee is to pack hops in such a manner, that the atmospheric air can have no access to them; as, he observes, the present mode of packing hops in bags of coarse and open texture, admits the air, which, in time, very considerably deteriorates their quality, as well as allows of the intrusion of vermin. He also designs to compress them into a much smaller bulk than they usually occupy when at market, in bags or pockets. For this purpose he proposes to construct a hexagonal case, with the ends open, about eighteen feet long, and about two feet wide, which is to be placed erect in a wooden frame, and its lower end raised about six feet from the floor. Into this box it is intended that a presser, rammer, or piston should work by means of a perpendicular screw press, which, by its descent, is to compress the hops closely together.

Economy in the expense of the packing vessels, as

well as closeness of stowage, are particularly considered; and it is intended to construct boxes which may be easily put together for use, or taken to pieces for conveyance. With this view it is proposed to place boards in an erect position, under the edges of the hexagonal case, so as to form a continuation of the case to the floor, and to brace these boards together by chains, afterwards by stops of iron hoop, and to nail them together by a hexagonal shaped board for a bottom. The hops are then to be filled into the case, and trodden in up to the whole height of the two vessels, when the screw press is to be applied with a hexagonal formed head under it, which is forced down until the hops are all compressed into the height of six feet; that is, entirely through the case into the lower box, constructed, as described, of the several pieces fitted and nailed together. The head, thus brought down by the screw, is now fastened by nails to the sides; and the box of hops is then removed from under the press, and considered packed for stowage, market, or exportation. If, however, its joints are not sufficiently close, they may be filled perfectly with a cement, or any other matter, so as to exclude the air; by which precaution it is stated that the hops may be kept perfectly good for half a century.

There are a great variety of slight deviations from the above process described, still adhering to the principle of compressing the hops and excluding the air, by cementing the joints of the vessels; casks of various descriptions, and metallic boxes are mentioned; but we presume, without particularising every minutiæ of this most extraordinary and elaborate specification, that the intention and leading feature of the invention will be understood by the above description.

Inrolled, January, 1821.

To Jacob Perkins, *of Fleet-street, London, for certain Improvements in the construction of fixed and portable Pumps; such as Pumps fixed for raising Water from Wells and other situations, or Ship's Pumps, or for portable Pumps which may be employed for Garden Engines, or in Engines for extinguishing Fires or other purposes.*

In this patent the inventor founds his claim of originality upon certain new modifications of principles, already known, and their application to hydraulic pumps for various purposes, not only as lift pumps to raise water, but as force pumps to eject water, particularly applicable to engines for extinguishing fire.

The improved parts of the pump may be enumerated under three heads: 1st. The enlargement of the bottom of the pump, or suction pipe, which is so contrived as to allow all bodies heavier than water, as sand, stones, pieces of iron, &c. to subside by their own gravity, so as to prevent the inconvenience of the pumps choaking, as frequently occurs on shipboard under circumstances of extreme danger. 2dly, The combination of the plunger and pump box, so as to produce a forcing stroke both by the ascent and descent of the plunger: and, 3dly, The separation of the valves from the stuffing of the pump box, by which means a much larger water-way is effected than in any pump of similar size hitherto produced.

Plate III. fig. 1, is a section of a fixed pump for raising water from wells, or out of the hold of a ship, which is also capable of being converted into a forcing pump, for extinguishing fire and other purposes; *a*, is the chamber or working barrel of the pump, and *b*, a plunger, occupying half the calibre of the barrel, working up and down through a stuffing box: *c*, is an air vessel,

which may be attached to the nozzle *d*, when it is required, to be converted into a forcing pump or fire engine, in which case the hose is to be connected to the end of the nozzle; *e*, the pump box, attached to the plunger; *f*, the lower pump box, which is made water-tight by binding in the contracted part of the barrel; the bottom of the pump may be enlarged, as shewn in fig. 2, at *g*, or in any other way, provided it is sufficiently wide to allow the water to rise slowly, in order to prevent all heavy substances from coming up with the water, and getting into the pump barrel.

Fig. 2, is a portable forcing pump, to be employed as a garden engine or fire engine, in which *a* is the chamber, *b* the plunger, passing through the stuffing box, the interior parts of which are shewn in the section, fig. 1. In this portable pump, however, it is to be particularly remarked, that the plunger, or piston, *b*, is made hollow, for the purpose of allowing the water to rise within it up into an air vessel *c*, at the top of the plunger; *h h*, are handles by which the plunger is to be raised and depressed by the men standing upon a platform.

Fig. 3, shews a section of the application of a combined plunger and common pump box to a fire extinguishing engine, in which *a*, is the chamber or working barrel *b*, the plunger occupying half the calibre of the barrel as before, and passing through a collar of leather, or stuffing box, to be raised and depressed by any of the known means connected to the rod *c*; *d*, is an external cylinder, two and a half diameters of the chamber; between this and the chamber is another cylinder *e*, half a diameter larger than the chamber. These three cylinders are all connected together, and cemented to the top plate by means of a quantity of soft solder; the working barrel and external cylinder are also connected in a simi-

lar way to a bottom plate; but the cylinder *e*, does not extend down so as to join this plate, by about two inches.

The action of this engine is as follows: on the rise of the piston bucket, or pump box *f*, the water will flow through the valve *g*, into the chamber, *a*, in which a partial vacuum is formed; again on the descent of the plunger, the water will be forced through the pump box into the upper part of the barrel, and thence through the holes at the top of the barrel into the cylinder *e*, whence it will flow into the cylinder *d*, which now becomes an air vessel. Thus the ascent and descent of the plunger will continue to force water into the external cylinder, or air vessel *d*, and the elasticity of the air will eject the water with force, through the discharging muzzle *h*, to which the hose is to be attached: *i*, *i*, are rods, or bolts, six or eight in number, holding the top and bottom plates of the cylinder firmly together.

Inrolled, December, 1820.

There is a considerable and important improvement in the mode of uniting the leather for forming engine hose, invented by Mr. Perkins, but which, though applying to the above engines, does not form a part of this invention, as it had been used by Mr. P's agents in this country prior to the sealing of his patent. It is to unite the edges of the leather, by means of copper rivets, either in single or double rows, at very short intervals, instead of sewing them together with hempen thread as heretofore; this mode has been found most effective and durable; for its communication, the Society of Arts has adjudged him their silver medal.

To William Swift Torey, *of Deeping St. James's, Lincoln, for certain improvements on Drills to be affixed to Ploughs.*

This improvement consists in the construction of an apparatus to be attached to Ploughs of the ordinary description, for the purpose of sowing seeds of various sorts in the manner called drilling. The box containing the apparatus, is shewn in plate II. of which figure 1. is a perspective view, so much of the sides of the box being removed, as is necessary for the purpose of exposing the interior; *a*, is a wheel, which runs upon the land, (giving motion to the parts within) attached to the shank *b*; this shank passes through the plough beam, to which it is fastened by a wedge regulating the depth of the plough. There is an iron upon the side of the box for the purpose of connecting the shank and box together, by a bayonet fastening at bottom, and by a mortice and key at top. The axle of the wheel *a*, passes through a hole in the side of the box, and at its extremity receives the pinion *d*, which takes into the cog wheel *e*, affixed to the axle *f*, of a wheel carrying cups. The pivot of this last mentioned axle rests in a lever at *g*, and in a brass collar at *h*. The grain intended to be sown, is placed in the upper part of the box, divided off from the lower part by a partition, which grain descends into the lower compartment of the box through an aperture, the delivery of which is regulated by a slide, or feeding gage, to be opened or shut more or less by a screw, *i*, which extends to the outside of the box. The cups attached to the wheel are carried round by the revolution of the spindle *f*, which is turned by the pinion *d*, (as the land wheel revolves, upon the axle of which this pinion is fixed as before mentioned), taking in to the cog-wheel *e*, upon its axis, and as the cups revolve they take up a portion of the seed and deposit it

PLATE I

Torey's Plough Drill.

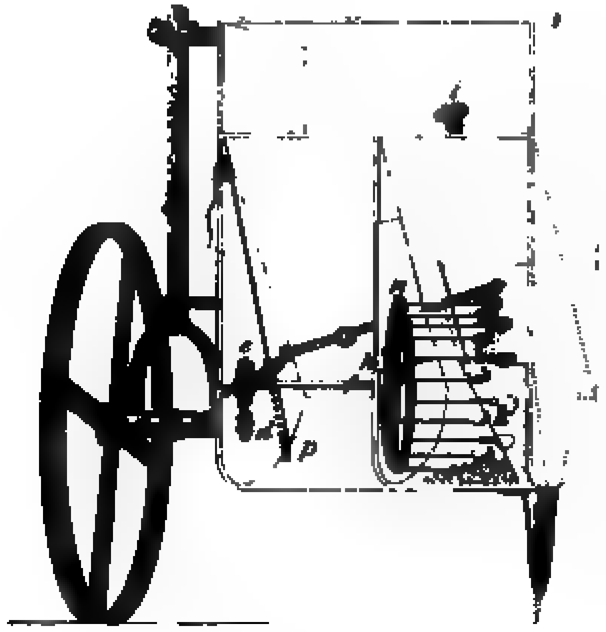


Fig. 1

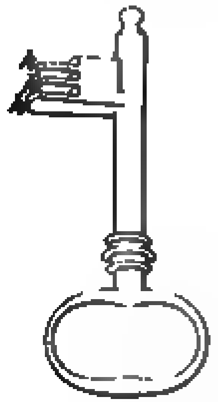
Birkinshaw's Rail.

Fig. 2.

Mallets Lock.

Fig. 3.

Fig. 4.



Perkins's Water-wheel.

Fig. 5

in the funnel *k*, from whence it descends through the spout *l*, down into the furrow.

There is a contrivance when the drill is required to be out of action, as in turning the plough at the end of the furrows, to throw the cog-wheel *e*, out of geer, and hence to stop the revolution of the cups. This is done by means of a string which passes from the plough-handle into the box, and is connected to the lever, in which the pivot of the spindle *f*, rests as before mentioned; by pulling the string, the lever is raised, and the cog-wheel drawn up out of geer with the pinion, and, of course, the revolution of the cups are stopped, at the same time another lever shuts off the feeding. But when it is required to put the drill again into action, the string is released from its holdfast at the plough-handle, and a worm spring *p*, pulls down the lever and brings the cog-wheel *e*, again into geer with the pinion *d*. There are to be several pinions *d*, accompanying the drill to fit on to the axle of the land-wheel in which the numbers of teeth are to vary for the purpose of giving different velocities to the axle; and also several axles *f*, in order to be exchanged to suit circumstances, on which the number and sizes of the cups are to be varied according to the quality and quantity of seed to be sown. To remove these axles and exchange one for the other, it is only necessary to withdraw the middle sliding partition *n*, which confines it in its place. By the addition of another set of cups placed at the back of the cup-wheel, two rows of seed might be drilled at the same time.

The patentee further observes, by way of directions in using, that for drilling with cole-seed or turnip-seed, it will be necessary to apply a spindle with seven very small cups, and to fix upon the axle of the land-wheel a pinion *d*, with nine teeth, taking into a cog-wheel *e*, with

fourteen, which will sow two quarts per acre; or a pinion with eleven teeth, which will sow three quarts; or with thirteen, four quarts per acre. Barley, wheat, oats, beans, &c. will require eight cups to be used rather larger, and a pinion with nine teeth, to sow two bushels per acre; eleven teeth to sow two bushels and a half; and thirteen to sow three bushels.

The box and the apparatus may be removed from the plough with the greatest ease by taking off the pinion, *d*, and withdrawing the key which confines the shank in the iron socket. The drilling machine may then be carried home in a common sack as its weight does not exceed twelve pounds.

Inrolled, December, 1820.

To JOB RIDER, *of Belfast Foundry, Ireland, for certain improvements which produce a Concentric and Revolving Excentric Motion, applicable to Steam Engines, Water Pumps, Mills, and other Machinery.*

THESE improvements apply particularly to the construction of a rotatory steam-engine, a section of which is shewn in Plate III. Fig. 4; the manner of communicating the powers of steam in this engine, so as to obtain a rotatory motion, is as follows:—Let the branch or passage, *a*, be supposed to lead from the boiler, and convey the steam from thence into the external fixed cylinder, *b*, *b*, *b*, *b*. Let *c*, *c*, *c*, *c*, represent an inner cylinder revolving upon an axle, *d*; which cylinder may be hollow or solid, but having the grooves or recesses, *e*, *e*, *e*, *e*, the whole length of the cylinder, for the purpose of receiving the sliding valves or pistons, *f*, *f*, *f*, *f*, which slide out of the grooves as far as the periphery of the outer cylinder,

b, of course shutting off the passage of the steam toward the eduction or exit-pipe, *g*. But the expansive force of the steam, acting against the side of the sliding piston, *f* 1, will impel it forward and drive round the inner cylinder, *c*, to which it is connected. When the piston, *f* 1, has reached the situation of *f* 2, the piston, *f* 4, will have arrived at the situation of *f* 1; and, by sliding out, become the resistance against which the elastic power of the steam will now exert itself. Thus the volume of steam, contained between the pistons, *f* 1 and *f* 2, will pass off through the eduction pipe, *g*, either to the condenser, or into the atmosphere; and, in its passage forward, produce the rotatory motion, which may be communicated from the axle to the moving of other machinery: *h*, *h*, is a portion of another cylinder placed in an excentric situation within the larger cylinder, *b*; and touching the periphery of the smaller cylinder, *c*, or ribs, may be so formed and placed in a spiral position, as to reduce friction and make the wear of the pistons equal. As the pistons, *f*, *f*, *f*, *f*, rise and work against the excentric, *h*, they are forced into their recesses, at *f* 3. The opposite pistons are connected together by the rods, *i*, *i*, which pass through the axle, *d*, so that, as one of them in rising is forced into its recess by pressing against the excentric, *h*, *h*, the opposite is projected out, meeting the periphery of the larger cylinder, *b*. The end plates, *l*, are connected to the axle, *d*, and revolve with it, having slits or guides for the studs at the ends of the plungers or sliders, *f*, *f*, *f*, *f*, to move in; these plates are inclosed by caps, which meet and are bolted to the flanches of the cylinder, *b*, *b*, with stuffing all round the periphery in order to enclose the whole apparatus steam-tight: *j* is a valve or flap to be opened when occasion requires, in order to gain access to the smaller cylinder and to the sliding pis-

tons; and *k* is a cover closing the aperture. The excentricity of the segment of the cylinder or ribs, *h*, *h*, before described, is to be varied according to the number of sliding pistons employed. If four, as in the section, then the segment must be placed with an excentricity which which will cut off one-fourth of the diameter of the larger cylinder, *b*, *b*, *b*, *b*. If six sliding valves or pistons are employed, then the excentricity of the segment, *h*, *h*, should be such as to cut off one-sixth of the diameter of the cylinder, *b*, *b*.

The patentee observes that this revolving power is applicable either in a vertical, oblique, or horizontal direction, as circumstances may require, and may be made so that its speed will suit for turning-lathes, carding, roving and spinning machinery; thrashing and winnowing machines; corn mills; paper mills; saw mills; propelling of ships or vessels; moving coaches and other carriages; and for other purposes, without the use of fly-wheels, cog-wheels, or other intermediate machinery. A fall of water may be applied to this machine, as follows: the pipes, *a* and *g*, must be larger than when steam is used. Let the branch *a* be connected with the head for receiving the water, and the other branch *g* be connected to the bottom for discharging it; the water, by its gravity, will produce a power to turn the axis according to the size of the sliding valves or pistons, and the weight of the water thereon; and motion may be thus communicated to various machinery by wheel-work in the common way or otherwise. This engine may be used for raising and forcing water in the following manner:—By applying power to the axis, and turning it in a reverse direction, the machinery will raise and force water to any height required. This machine may also be made to pump or force air and other fluids, and also be converted to a blowing ma-

chine for smelters, smiths, and founders. The inner cylinder, with its slides, without the external cylinder, may be employed for propelling ships or other vessels, sufficient power being given to turn it, and a frame being placed over it to move the sliders, which, in this case, becomes the pudders; and as the cylinders revolve, the sliders will produce the same effect as the common puddle wheel, although the cylinder and its puddles are wholly immersed in the water; and it will also have another advantage: for, by the cylinder being made hollow and water-tight, it will possess a considerable degree of buoyancy; and it may be placed either at the bottom or side of the ship or vessel, as may be found most convenient.

Inrolled, January, 1821.

To JOHN HAGUE, *of Great Pearl-street, Spitalfields, London, for an Improvement in preparing the Materials for making Pottery Ware, Tiles, and Bricks.*

THIS preparation of materials consists in separating from the clay the stones, roots, and other extraneous matter it may contain, which is effected by forcing the clay through holes or slits as of a cullender or sieve, by which all substances which are larger than the apertures are retained, and only the clear clay delivered out through the interstices.

The machinery proposed in the specification consists of a square trunk, strongly made, its sides being occupied, between the framing, with bars or wires, set a small space asunder; into this trunk the materials to be prepared are put. A piston is then forced into the trunk down upon the clay, by which it is pressed out through

the apertures, cleansed of all extraneous substances. At the bottom of the trunk is a box, in which the stones, roots, &c. remain; these are removed by opening a door provided for that purpose.

The piston is worked by means of a rack attached to it, and a pinion taking into the rack, upon a shaft, which is to communicate, by any of the known methods, with a steam-engine, water-wheel, horse-wheel, or other power; and is put in or out of action by a clutch-box sliding upon the shaft. A pin is fixed in the back of the rack, in such a situation, that, as the piston approaches the bottom of the trunk, this pin may bear upon a lever, and disengage the clutch-box, by which the action of the machine is stopped. By a reverse motion, or some other contrivance, the piston is again raised, when the trunk must be supplied with more materials to be operated upon as before.

The patentee further states, that he proposes to form bricks and tiles by having holes, at the bottom of the machine, the size of the end of the brick or tile, which are to be cut off by wire as they come out of the holes.

Inrolled, December, 1820.

To William Mallet, *of Marlboro'-street, Dublin, for an Invention of certain Improvements on Locks, applicable to Doors and other purposes.*

The superiority of this lock over others already before the public, is considered by the patentee to consist in three particulars: 1st, its strength; 2d, its security; and, 3d, its simplicity of construction. A perspective representation of the interior of the lock is shewn in plate II.

fig. 3: *a*, is the bolt; *b*, sliders, or guards; *c* and *d*, two stubs, or pins, for guiding the sliders; *e*, a moveable collar, carried round by the key; *f*, a spring, or several springs, acting upon the tops of the sliders; *g*, a guide-plate, attached to the bolt, in which the sliders *b* rise and fall. The action of the lock is as follows: A key, as fig. 4, with projecting parts, *h*, upon its edge, is introduced into the key-hole, which, on being turned, carries the collar, *e*, round with it; and when the projecting parts, *h*, of the key arrive at the guide-plate, *g*, they pass into the mortices of that plate, and raise the respective sliders off the pin, *c*, which occupied the notch, *i*, and project the sliders, bolt, and guide-plate forward. When the sliders fall again, the pin, *e*, occupies the notch, *j*.

Hence it will be seen, that if the projections upon the edge of the key are not made sufficiently long to raise the sliders, they will not pass over the pin, *c*; or, if they are too long, the sliders will not pass under the pin, *d*. The strength of the lock will be evident, by the solidity of all its parts; its security in the difficulty of making a false key which shall raise those sliders to the exact height, the works being shut up from observation; and the simplicity and consequent cheapness of this lock in its being without wards, which also renders it less likely to be put out of order.

Inrolled, January, 1821.

To John Shaw, *of Mary-street, Fitzroy-square, London, for a new Method of making Bricks by Machinery.*

The machinery herein proposed for the making of bricks consists of a frame carrying a horizontal piston or press, which forces the clay (supplied from a hopper)

into a mould or box, properly shaped, and thus forms the brick. The action of the piston is obtained by two bars connected together, forming an elbow-joint, the angle of which is more or less straightened by the revo lution of an excentric wheel having its periphery working against the joint of the two bars, and hence, as its larger radius comes against the joint, causing it to rise, by which the angle that the bars made with each other will become more obtuse; of consequence they will elongate, and press against the piston, to which the end of one of the bars is connected, and thus press the clay into the mould or box.

From a rigger communicating with the first mover, a band is carried, which turns an axle (having many arms) placed over the hopper, by which the clay that is from time to time put into the hopper, is cut in small pieces, and forced down into the mould-box before mentioned. Thus the clay is supplied to the mould-box by being forced down through the hopper, and the brick is formed by the force of the connected bars, which press it into form when in the mould. There is a contrivance for pushing out the brick, when made, from the mould, by means of a stud acting against a lever, which opens the end of the mould-box, and the bricks are then received, one by one, on an endless web which conveys them away from the machine.

This apparatus may be moved by any of the known means of manual, horse, or steam power, &c. and may have a fly-wheel to equalize its motion; its parts may be varied, and it may be constructed to make one or more bricks at an operation, all of which modifications the patentee claims.

Inrolled, December, 1820.

To Robert Winch, *of Shoe-lane, London, for certain Improvements on Machines or Presses, chiefly applicable to Printing.*

These improvements on machines are for the purpose of self-inking the types, supplying the paper, and printing the sheet at one operation. The apparatus consists of a frame holding two tables or forms of letter, two presssing rollers, four inking rollers, and four frames for guiding the sheets of paper on to the pressing rollers to be printed. The motion of the rollers (which may be communicated by manual labour, or any other means) is to be reciprocal, like the motion of a horizontal mangle, and which, by *one* entire forward and backward traverse, is intended to print four sheets of paper. The bed, or basis of the machinery is upon two inclined planes, meeting pyramidically in the middle, over which a roller, or shaft revolves, turned by a winch, or by any other contrivance, connected with a first mover. Chains pass round this centre roller, connected with the pressing rollers, one of which is made to roll up one of the inclined planes by the chains attached to its axis coiling round the centre roller, whilst the other, by its own gravity, rolls down the other inclined plane, by its connecting chains uncoiling. As these pressing rollers traverse, they cause the inking rollers, four in number, to pass over the types, having been previously supplied with ink from the ducts distributers, and spreading boards, much in the usual manner. Thus, the two tables or forms of type are each twice inked, as above described, by the traversing of the rollers; and, as each pressing roller reaches the extremity of its action, both at the middle and ends of the frame, a catch and lever causes the sheet of paper to be brought down in its frame to meet the pressing roller, which draws

off the sheet from its frame, and causes it to lap itself round the periphery of the pressing roller, by which the sheet is carried forward on to the types, and receives its impression. The farther progress of the roller brings the paper up again, which is taken off by tapes, and is thence conveyed by hand to the pile of sheets before printed.

Inrolled, September, 1820.

When we compare this apparatus with Kœnig's patent inventions, and that of Rutt, we are at a loss to discover in what part of the plan the present patentee founds his claim of novelty and originality; the apparatus, however, herein proposed as a machine altogether, appears to possess the requisites for the performing of its business in a correct and expeditious manner.

To John Vallance *of Brighton, Sussex, for a Method and Apparatus for freeing rooms and buildings, whether public or private, from the distressing heat, sometimes experienced in them; and of keeping them constantly cool, and of a pleasant temperature, whether they are crowded to excess, or empty; and also whether the weather be hot or cold.*

The specification of this patent, after expatiating at considerable length upon the dangerous consequences to the health of individuals, as well as the unpleasant sensations produced by the extreme heat of crowded rooms, and also upon the present ineffectual modes of ventilating places intended for public assemblage; proposes the following methods to be resorted to under existing circumstances: (viz.) in the first instance, simply for the supply of pure air, to inject it in its natural state, by means of a

pump, from the atmosphere into the crowded room; secondly, for alleviating the extreme heat by cooling the air, before it is conveyed into the room; and thirdly, when it may be necessary for warming the place, to heat the air previously to its being injected.

For this purpose it is designed to erect a condensing or injecting air pump, or large bellows, in some convenient part of an adjacent building, from which a pipe is laid, conducting the air round the room, behind the skirting board; which pipe is to have minute openings to allow the passage of air in small streams, so as not to annoy the company. In the event of the natural state of the atmosphere being too warm to afford the necessary cool refreshment, it is proposed that the air, thus injected, should be condensed in pipes or other vessels, and deprived of part of its caloric (matter of heat). Several modes are proposed to effect this, one of which is to force it through cold water, or through pipes surrounded with cold water, when the temperature of the atmosphere is too cold, the air is proposed to be passed through hot water or heated pipes.

The pump or bellows to be employed for this purpose must be large, as the quantity of air required to be injected is calculated at one entire foot for each person present per minute. The piston of the pump is proposed to be worked by a contrivance similar to the pile driving machinery, with a weight of about one thousand pounds. The windows and all other parts, are intended to be rendered air-tight by luting; the only exit passage, or ventilator is to be an aperture in the ceiling, from which a pipe is to lead to a cistern or reservoir without the building, making a water valve, through which the air is to make its escape when sufficiently condensed by the pumping before mentioned; so that the room at all times is, as the patentee expresses it "more than full" of air.

In order to exclude as much as possible the atmospheric air, it is proposed to place on the outside of the door-way a cylindrical porch having two openings opposite each other, of about four feet wide; and in the middle of this cylinder to erect an upright revolving shaft, with four fans, as the fans of a winnowing machine; the edges of these fans are to fit as close as may be to the interior of the cylinder; and each person, on entering the room, is to pass between these fans as they revolve like a turnstile, by which the rushing in of air, when the door opens, will be prevented, and the interior contain an artificial atmosphere produced and maintained by the means before described.

Inrolled, December, 1820.

Among the many wild schemes and theories which are occasionally dignified with the title of patent, we have rarely met with any more impracticable or ridiculous as to intention as well as execution than the above. The specification contains a most elaborate essay on the plan and its various modifications; but we trust that the foregoing account will be found amply sufficient to explain all its *merits* and *advantages.*

Original Communications.

On the Course of the Niger.

To the Editor of the London Journal of Arts and Sciences.

SIR,

THE gravity with which accounts of *supposed* discoveries of various kinds are often presented to the public, by persons who have taken little pains to make themselves acquainted with what is already known upon

the subjects to which any particular discovery may relate, is not more amusing than it is extraordinary. It is not in the province of a journalist always to be acquainted with every publication which issues from the press; but I think there seems to have been latterly a perversity in some of our modern journalists, in publishing stale accounts of the *course of the Niger*, which, at the present period, would almost disgrace a school-boy. I have seen it stated in more than one journal, that the Niger flows towards the east (which, in part of its course, it unquestionably does,) and that it is neither more nor less than the *same river as the Nile;* and we have been also favoured with learned Arabic references and dissertations to prove this extraordinary supposition.

In the *Philosophical Magazine* for last month, page 458, it is said, under the article "THE NIGER,"—"It is at length ascertained, that this river empties itself into the Atlantic Ocean, a few degrees to the northward of the Equator. This important fact is confirmed by the arrival of Mr. Dupuis from Africa. This gentleman was appointed consul from this country to Ashantee (where Mr. Bowdich resided for some time.) He is acquainted with the Arabic and Moorish languages, and got his intelligence by conversing with different traders with whom he fell in with at Ashantee. He thought it so important as to warrant his voyage home, to communicate to Government what he had learnt. We say, that Mr. Dupuis has *confirmed* this fact; for it so happens, that he has been anticipated by a gentleman of Glasgow, who arrived at the same conclusion by a most persevering and diligent investigation of the works of travellers and geographers, ancient and modern, and examining African captives; and had actually constructed and submitted to the inspection of Government, two or three months ago, a map

of Africa, in which he lays down the Niger as emptying itself into the Atlantic in about four degrees north latitude, after tracing out its entire course."

All this information is well for those who have not read ROBERTSON'S NOTES ON AFRICA, published in October, 1819;* but to the readers of that work it is no news whatever: for Mr. Robertson not only informs us that the embouchure of the Niger is in the Gulph of Guinea, but he has also given in his map the course of that river, and its different mouths. His words are these, page 210:

"The Ashantees appear to have more correct ideas of the geography of Africa than any other nation which has communication with Europeans. They speak with confidence relative to the course of the Niger, which they call *Insukessey*, and say, *that it continues its course to the eastward, until it falls into the lake Bondoo, which receives, besides, many other great rivers*; *and that it discharges its waters by three arms, which divide and fall into the sea by many branches in the Bights of Benin and Biafra, in the Gulf of Guinea, each by its magnitude being a great*

* Notes on Africa: particularly those parts which are situated between Cape Verd and the River Congo; containing sketches of the geographical situations, the manners and customs, the trade, commerce, and manufactures, and the government and policy of the various nations in this extensive tract; also a view of their capabilities for the reception of civilization; with hints for the melioration of the whole African continent. By G. A. ROBERTSON, Esq. Illustrated with a map of the countries visited; to which is added, an Appendix, containing a compendious account of the Cape of Good Hope, its productions and resources; with a variety of important information, very necessary to be known by persons about to emigrate to that colony. 8vo. Sherwood and Co.

river, even in the dry season. As this statement is corroborated by the information obtained from the natives on the sea coast, and also by the inland traders, I do not offer the Ashantee statement as hypothetical, but as one which may be considered as certain, and perfectly consistent with the geographical situation of this part of Africa. Indeed every natural appearance supports this opinion. The land near the shore, from Lagos to Old Calabar, is flat and alluvial, and the general physiognomy of the country in the neighbourhood indicates the same thing; added to which, and most important of all, is, the great quantity of water which is discharged by the various rivers into the Gulph of Guinea, which must be supplied by long and never-failing streams.

"A ridge of mountains has been commonly assumed as extending to a great distance from east to west, on this part of the African continent. But this opinion is contradicted by the native traders, who unanimously agree, that the country is intersected with heights, but with no ridges.

"On passing from Lagos to Calabar, the number of rivers which roll their tribute of waters to the ocean is astonishing: *there are no less than twelve which are from half a mile to four miles in breadth at their entrances, and most of them are navigable for large vessels.* Where can such rivers arise? Their being the exit of the Niger and its tributary streams can alone solve the problem." Page 212.

"From the navigable advantages which present themselves in the Gulph of Guinea, it seems formed by nature as the key of the intercourse of Europeans with the interior of Africa." Page 213.

Thus, Sir, has the mission of Mr. Dupuis, and the labours of a gentleman of Glasgow, been shewn to be

works of complete supererogation. Mr. Robertson's book is addressed to the President of the Board of Trade, the Right Hon. F. Robinson; so that there is every probability that Government has been in possession of the knowledge of the course of the Niger, and its consequence to commerce, long before any communication made by Mr. Dupuis; and I have reason to know, that the "*Notes on Africa*," before they were published, were put into the hands of some members of parliament, and, I think also, some of the members of administration. Why more notice has not been taken of Robertson's book, I cannot tell; but it appears to me to be every way worthy the attention of those who desire to become acquainted with that portion of Africa about which Robertson writes. It contains sound commercial views, advantageous for civilised society, and also details the best plans for civilising the African people, which have hitherto been published: "LET HER HAVE AN INTEREST IN HER OWN LABOUR, AND THAT INTEREST WILL BE THE STRONGEST AND BEST SECURITY FOR HER FRIENDSHIP. SHEW HER THE ADVANTAGES OF INDUSTRY, AND WILL SHE SO FAR DEVIATE FROM THE USUAL MOTIVES WHICH ACTUATE MANKIND, AS NOT TO CULTIVATE SUCH A CONNEXION IN ORDER TO IMPROVE HER OWN CONDITION? There is but one system for us which can secure her friendship and her social intercourse, and that is, AN EQUITABLE USE OF OUR AND HER RIGHTS: for we must not take all and give nothing." "*Is there a human being in existence who could not be* MORE EASILY *led* WRONG *than driven* RIGHT?" &c. &c. These, Sir, are sound observations, but I must conclude; and have only to regret that I have troubled you thus far. But justice to the public, and, I may add, justice to an individual, Mr. Robertson, who is, I understand, now on some part

of the coast of Africa, and from whom some further communication relative to Africa may be reasonably anticipated, has prompted these remarks. It is scarcely necessary to add, that Mr. Robertson is well acquainted with many of the African dialects.

I am, yours, &c.

London, Jan. 16, 1821. CANDOUR.

Observations on GRAY'S *Supplement to the Pharmacopœias.*

To the Editor of the London Journal of Arts and Sciences.

SIR,

A WORK has lately been put into my hands entitled "*A Supplement to the Pharmacopœias*, by S. F. Gray."—From the singular nature of its contents, and as being connected both with the arts and sciences, I am induced to submit to the public, through the medium of your Journal, a few observations on it. I am free to admit that it contains much important information, which it is very desirable should be generally known; but, I confess my surprize, that a lecturer on the Materia Medica could sully his preface with the following observations.

"Another class of receipts, which has never yet been published so distinctly as in the present work, is in the substitution or reduction in price of sundry articles. This by many is styled adulteration, and all the topics of vituperative rhetoric are lavished upon the practice, and very justly, when the substitutes, or reduced articles, are sold at the same price as those which the druggists technically distinguish by the appellation verum: this, however, is a practice of which no house of any respectability would be guilty. These substitutes, and reduced articles, are manufactured for two descriptions of custo-

mers: first, those very clever persons, in their own conceit, who are fond of haggling, and insist on buying better bargains than other people, shutting their eyes to the defects of an article, so that they can enjoy the delight of getting it cheap; and, secondly, for those persons who being but bad pay-masters, yet, as the druggist, for his own credit, cannot charge more than the usual price of the article, must therefore deteriorate it in value to make up for the risk he runs and the long credit he must give."

Sir, I do not happen to know, except by his book, the author of the above paragraph; but surely a more complete string of sophisms and excuses was never exhibited for the debasement and adulteration of drugs. Had the fraudulent druggist studied for years he could not have made out his case more effectually. According to Mr. Gray, if an adulterated article be charged at a reduced price, no fault lies in the adulterating vendor of it, but in the buyer. Surely this is egregiously false morality. The adulterating vendor of a drug *knows* that it is adulterated, the buyers very often know nothing about the affair; and if they did, the adulteration, *independent of price*, is altogether immoral; nay, if an adulterated drug were even given away by a person knowing it to be debased or adulterated, surely the act would be a very culpable one. All adulteration, that is, a substitution of one thing for another, and falsely calling it that other, is manifestly wrong; but the wrong is materially increased when drugs, which are often used for the purpose of the removal or alleviation of disease, are so adulterated. It is no excuse in morals for a tradesman to say, I must adulterate such drugs or I cannot carry on trade; I shall lose my custom, &c.; and, if I do not do so others will. And how, I should be glad to know, has the tradesman a right to sell

an adulterated drug to a customer who pays him badly? Surely his straight forward course would be not to serve him at all, rather than to serve him fraudulently.

We will now quit this gentleman's preface and turn to the work; and here it will be difficult to avoid vituperation, although cautioned against it by the author. The terms REDUCTUS and FACTITIUS are indeed very conspicuous in some parts of it, so that the reader is at once directed to what he is to expect; but the *numerals* which are prefixed to many paragraphs are sufficiently indicative of their contents.

Thus we have *pulvis glycyrrhizæ reductus; pulvis enulæ reductus; cremor tartari reductus; pulvis corticis Peruviani factitius, &c.*

These are all, it is true, expressed in the Latin language; which, by the way, is no excuse whatever. But what shall we say to the following directions for cayenne pepper, *verbatim et literatim* from this work.

" CAYENNE PEPPER. *Piper cayenne.* Bacc. capsici, sal. comm. ana, one pound, grind together; colour with vermillion; some use red lead, but this is injurious.

" 2. Capsicum, q. p. bury in flour; bake till they are dry enough to powder; then holding them by a pair of pincers, cut them in small pieces; to each oz. add flour, 1lb.; water and yeast, q. s. to make them into small cakes; bake; slice the cakes; bake over again; powder the biscuit, and sift it." See page 320.

If this be not enough to warrant severe censure upon this work, I have done. Had a second title been added to it, calling it " *The Art and Mystery of Adulterating Drugs,*" *&c. &c.* it would have appropriately characterized it; but this would have been too gross, too open, and too true.

I am, yours, &c.

NON REDUCTUS.

London, Jan. 19, 1821.

P. S. I had at one time some thoughts of compiling a history of the adulteration of drugs, and also of adding the best method of detecting them; but, upon mature reflection, I abandoned the design: for although some persons might be benefited by the disclosure, others might take advantage of it and become adulterators. I cannot, therefore, approve of works which bring these adulterations unnecessarily, and in my opinion, improperly before the public; and, I suspect, that Mr. Accum's book has done more harm than good. But surely a book which teaches a sort of system of adulteration, ought not to be countenanced. It will give me pleasure to find that, in a future edition of Mr. Gray's work, this obnoxious feature has been removed.

On a new method of Sizing, Dyeing, and wetting Paper.

To the Editor of the Journal of Arts and Sciences.

Sir,

The sizing of paper in the manufacture of it, is tedious and uncertain, and sometimes with considerable loss in the handling of it; particularly thin bank note paper: from experience to myself, similar difficulties occur in wetting, soaking, and "pinching" it fit for printing, the waste weekly is considerable; the same occurs in dyeing paper for various purposes. I cannot prepare paper for printing, such as I use, sooner than twenty-four hours by the usual method of dipping it in water several times, in half and whole reams at a time, the common practice. I have discovered a method, by which I can size, dye, or wet paper to any amount, in a few minutes;

and by which means, every sheet shall receive an equal proportion of wet, without disturbing it from the evenly piled state it can be placed in while dry; a matter of great moment to every process the paper goes through afterwards, particularly in the pressing or pinching operation: for if displaced while wetting, it cannot be so evenly placed until dry again; the projecting edges consequently, are not pinched, but rot by the wet left in them, and lead to many cancels being made in the hurry of taking or lifting thin or soft paper, from the plates or types, while at the printing press. The process is simple and effective, and if it has occured to any one else, I very much wonder it has not been made known for the advantage of those disposed to make trial of it: if you think it worth notice, please give it a place in your excellent publication, the Journal of Arts and Sciences.

Provide a cast iron vessel of the dimensions necessary to receive the paper in the quantity required, which I find stands best upon its edges, supported at convenient intervals by thin slips of wood or pasteboard, but to be as little confined or pressed together as possible. The liquor, whether size, dye, or water, must be let in gently, so as not to disturb it; the liquid must rise considerably over the top edges, so that it may be wholly immersed. The lid is to be then laid upon the opening of the cast iron box, the connexion between both being ground together, so as to form an air-tight joint by the common means or assistance of a little tallow rubbed to the parts before put in contact. Extract the air by an air-pump, so as to get as near to a vacuum in the box as possible; let the air again in, and remove the lid, and you will find the effect produced; that is, the paper *completely wet* and UNDISTURBED. I can produce much better work by paper wet this way than the common method. Another ad-

vantage attending this process is, that no lying in wet to soak is necessary; for the air that is contained within every individual sheet is drawn out by the pump, which the liquor or water rushes in to supply the place of, the moment the atmospheric pressure is permitted to come in contact with the surface of the fluid.

I am yours, &c,

JOHN OLDHAM.

Bank of Ireland.

Novel Inventions.

Mr. Perkins's *Method of driving off the back-water from Mill Wheels at Flood Seasons.*

In dry seasons, when the supply of water is small, the fall at the mill tail is greatest; but at flood times its fall is lessened, or perhaps the water of the lower level or tail may be swollen to nearly one-third the height of the mill-dam, or upper level.

To remove the obstructions thus occasioned by back-water, Mr. Perkins has proposed a method of driving it off; and hence giving to a wheel, at all times, the full advantage of the fall, by withdrawing or driving off the accumulated flood from immediately behind the mill wheel.

For the accomplishment of this object, a channel is formed, through which part of the superabundant water at flood times is allowed to escape, which is conveyed under the wheel, as shewn in plate II. fig. 5. By the momentum of the water thus rushing through the channel,

the tail is driven away from the back of the wheel, which enables it to revolve without being impeded by the swollen water at the lower level. This contrivance had been adopted, as Mr. Perkins informs us, in the United States for some years past, with the most complete success, enabling water-mills to continue in full action, when, from the accumulation of water in the mill streams at rainy seasons, the wheel, without such a contrivance, would have been overwhelmed with water, and hence prevented from revolving.

In adapting this contrivance to mill wheels already erected, it is proposed to carry the under channel before described by a circuitous route, so as to bring the force of the momentum of the water in a direction at right angles, to the axis of the wheel immediately under it; by which the tail water would be driven off in a lateral direction, and effect the desired object.

Pedo-motive Machine.

A CARRIAGE going without horses, in the neighbourhood of Tunbridge, has been much spoken of for its ingenuity. We have been long acquainted with its construction; but the great expenditure of labour necessary to impel it forward, renders it inapplicable to the ordinary purposes of conveyance.

Two men are employed to work it by their feet, and when laden with three sacks of coals, the necessary exertion is such, that they are compelled to rest frequently. Would not two men draw a carriage having twice the burthen with half the labour?

Terrestrial Globe in Relief.

Several of the scientific journals mention, in terms of considerable commendation, New Terrestrial Globes, of 12 and 15 inches diameter, recently published by M. Chas. P. Khummer, of Berlin, on which the mountains are executed in relief; adding, "the idea is good, and we hope will be adopted in London, as being admirably calculated for geographical instruction."

The scale of proportion between an artificial globe of 12 inches and the Earth itself, is about 660 miles to one inch, that of a 15-inch globe about 530 miles to one inch. The height of the Andes or Cordilleras, mountains in South America, estimated at about four miles high from the level of the sea, would, upon either of these globes, be designated by an elevation of little more than the 1-100th part of an inch!

On the application of Chromate of Lead to Dyeing Silk, Woollen, &c.

M. Lassaigne in the course of some experiments upon chromate of lead, has succeeded in combining this salt with all cloths, by a process similar to that which M. Raymond employed to dye silk with prussiat of iron. After having immersed well cleaned skeins of silk for a quarter of an hour in a weak solution of subacetate of lead, he took them out and washed them in a large quantity of water. Thus prepared, they were afterwards immersed in a weak solution of neutral chromate of potash, when, in ten minutes, they took a fine colour; they were then washed and dried. This colour was unalterable by exposure to air. By varying the proportions of subacetate of lead, and chromate of potash, tints varying from pale to deep yellow may be obtained. The same process is applicable to woollen, cotton, and linen.

But it is better to digest them in a relation of acetate of lead, heated to about 130 of Fahrenheit. This colour is however liable to be partially decomposed by wet, and is therefore chiefly adapted for dyeing silk.

Magnetism.

An ingenious work, by Mr. P. Lecount,* has lately appeared, which tends to throw considerable light on the obscure subject of *Magnetism*. It has been long known, that ship's compasses will point differently the instant after the ship has been tacked; that they will often agree in some positions of her head, and materially disagree in others: and that, placed in different parts of the ship they will also point differently.

Mr. Lecount informs us, that ship's compasses are often placed too near each other, when two are used on deck; and that they thus disturb each other's motions. When placed a-breast, as in binnacles, their mutual attractions will disturb each other least at N. S. E. W. and most at N.E, N.W, S.E, S.W. and proportionably between these points, which arises from the attractive and repulsive powers of the North and South Poles, acting on each other with different degrees of force in these directions; and it will, when the compasses are two feet apart, sometimes cause a difference of nearly a quarter of a point.

It is said, that bars of iron which have remained long in a vertical position acquire a magnetic property, the upper end being south and the lower end being north;

* A Description of the changeable magnetic properties possessed by all Iron Bodies, and the different effects produced by the same on Ship's Compasses, from the position of the head being altered; with engravings. By P. Lecount, Midshipman, in the Royal Navy.

but Mr. Lecount informs us, that it requires no time whatever for iron to acquire this property: its communication is instantaneous. It may indeed require time to occasion it to retain this property. Nor is the fact of its polarity correct, excepting in the northern magnetic hemisphere: in the southern, it is perfectly contrary; the upper end is a North Pole and the lower a South.

Iron, of all descriptions and of all sorts, bars, circles, guns, bolts, hoops, staunchions, &c. and whether placed horizontal, vertical, or in any inclination or position whatever, are acted upon in the strongest manner by the magnetic effluvia, and that most instantaneously; and this action is varied in a moment by the slightest change in the direction of the iron. Each and every one of these pieces of iron have two poles, which have each their respective powers of attraction and repulsion; and these poles, which are communicated by the magnetic effluvia, are instantaneously altered and reversed, &c. by the slightest change in the position of the iron; so that in a bar of iron eight feet long, laid horizontally, I have, by moving one of its ends one inch, altered it from a North Pole to a South one; and the changes which are requisite in the position of the iron to produce this effect are subject to a certain definable law. This law is as follows: A plane, or circle, held east and west (magnetic) and at right angles, with the direction of the dipping needle, will, in any part of the world, divide the north from the south magnetic effluvia, each lying on that side to which the dipping needle points; and by referring the position of all iron bodies to this plane, the line of intersection shall divide the iron into north and south polarity, provided it is of uniform thickness. If it be not of uniform thickness, the intersection must be drawn, not through the centre of its length, but through its centre of gravity. This plane will, therefore, be vertical on the magnetic

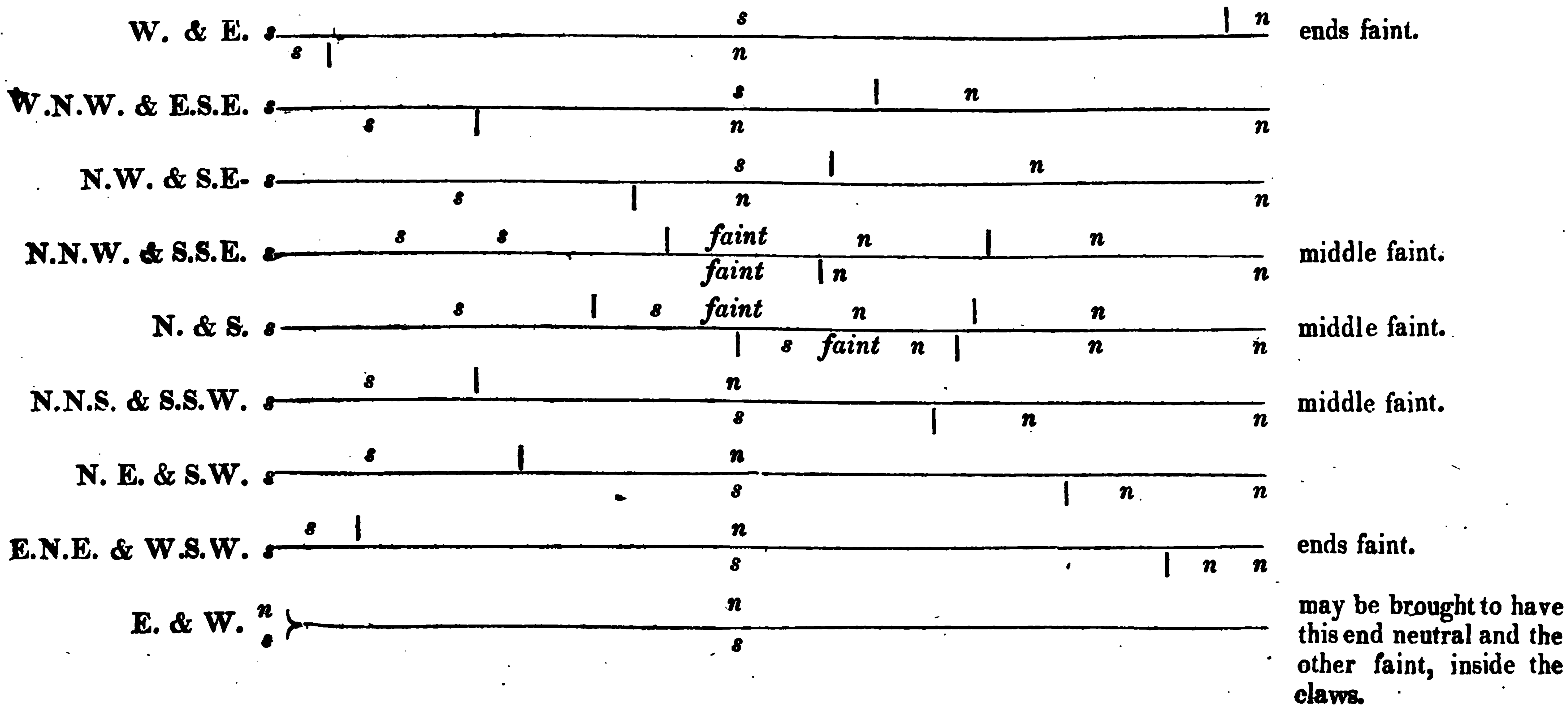
equator, and horizontal when the dip is either 90° N. or 90° S.; and will be inclined proportionally to the dip between these situations.

All upright pieces of iron have, in the southern magnetic hemisphere, as stated above, their upper parts north poles, and their lower ones south poles: this property changed in H. M. S. Conqueror, on her passage home from the Island of St. Helena, in latitude 11° 30′ S. and longitude 9° 29′ W. on the 23d July 1820; and every piece of iron in that ship, from observations at St. Helena and during the passage home, in whatever situation it was placed, might have had its polarity instantly determined at sight, from a consideration of the above law, by knowing the direction of the ship's head and the dip; and it has equally stood the test in other ships, and on shore in England.

The immense number of pieces of iron, both in ships of war and merchantmen, having each of them polarity, and that polarity instantaneously and continually shifting, and often reversing with the slightest alteration of the ship's head, thus presents an attractive power to the compasses; which power is continually acting on them in a direction which is regulated by their relative positions, and thus produces this variation in them so often observed.

The following experiments were made on an iron bar four feet nine inches long, laid perfectly horizontal, and moved in the following bearings, and a delicate pocket compass presented to its different parts; the letters annexed to the lines shew which pole of the compass the iron attracted, and the bearings on the left hand, one for the left hand of the bar, and *vicè versâ*. This mark, ______|______ shews when the change took place, or when the polarity was reversed, the effect being then neutral.

Lat. 16° S. Long. 5° 38′ W.



When this mark is ⊥ there is always a faintness on each side of it; the bearing in which the end was neutral, was about E. and W.

Relative to these experiments, it ought to be observed, that in whatsoever position the bar lay, by reversing it, its polarities were all instantly reversed; and this will invariably be found to be the case in all iron whatever, which has not been rendered permanently magnetical by other means. The quantity of inclination necessary to reverse the polarity, when in a vertical position, varied with the points of bearing in which the bar was held while being reversed, as may be seen by placing a ring, as before directed, in an E. and W. plane, and at right angles with the dipping needle.

These experiments, as well as some others, were again very carefully repeated in 29° north latitude, and 36° west longitude, and the results were exactly the same; only, as the dip had increased, it took more inclination to produce the reversion of the polarity. Thus, when the bar lay north and south, by lifting its south end no reversion took place, when it had considerably passed the vertical point; but by lifting its north end about 30 degrees, a reversion instantly took place. When the bar lay east and west, by lifting its east end eight or ten degrees, its poles were reversed; when the bar lay neutral at the ends, if its west end was lifted two degrees, its poles were reversed; inclining it more northerly, it took eight or ten degrees; at N. W. it took 15° to produce the same effect; and the bearing in which the ends were neutral, had, to appearance, drawn northward.

The effect of this power on compasses, will, of course, be more or less according to the number of these poles in a ship; and as they vary instantaneously and in every direction as the ship's head is shifted, the consideration of them will, in a great degree, be local; but the follow-

ing general remarks will, Mr. Lecount conceives, set the matter in a clear light.

1. Opposite poles pointing to each other, cause the compass to vibrate till settled, and then render it inert; for they attract.

2. Similar poles pointing towards each other, cause the compass to be repelled to the east or west, as the pole of the iron bears to the contrary.

3. When similar poles of iron bear from the compass N.E. and N.W. northerly, and S.E. and S.W. southerly, they repel the pole of the compass nearest to them, strongly proportioned to their distance, number, &c.

4. When opposite poles of iron bear from the compass N.E. and N.W. northerly, and S.E. S.W. southerly, they attract the pole of the compass to them, strongly proportioned to their distance, number, &c.

5. When the poles of the iron are, from the position of the ship's head, at right angles, or in a perpendicular direction from the needle of the compass, their effect will be weakened, as they will generally attract one pole of the compass as much as they repel the other.

In fact, the cause being once known, all material effects may be traced with little trouble.

The nearest bodies of any magnitude to compasses in ships of war are the guns; and they therefore require the most attention. And as their effect must be greater in proportion to their proximity to the compass, Mr. Lecount has found, that the smaller the ship, the more the compasses will be effected; and he thinks, that in a merchant vessel without guns, iron cargo, or iron stanchion hoops, though near the compasses, and those compasses placed four feet from each other, that no variation would be perceived in any position of the ship's head.

To find out the quality and direction of these attractions he directs,

1. Make a draught of the relative situation of the compasses, and of all guns, staunchions, and other large pieces of iron.

2. Estimate, by experiment, their greatest and least force on the compasses, which must be done when the ship's head is south, that the poles nearest the compasses shall be at a maximum and a minimum.

3. Make proportions or observe the strength of the attractive or repulsive power, for the intermediate points and enter it in a table.

Persons who desire further information must consult Mr. Lecount's work, which is every way worth the attention of captains of ships, and indeed of scientific persons generally.

Polytechnic and Scientific Intelligence.

GREAT BRITAIN.

Society of Arts.

It would give us considerable satisfaction, could we state that this society had returned to its wonted good sense, in the rejection of that obnoxious measure adverted to in our last. But although it has not yet become a law of the society, and although it has struggled hitherto with considerable opposition, from the soundest and most intelligent of its members, * we do think that if the same

* Amongst whom we may mention John Smith, esq. and Mr. Northhouse, as having advanced eloquent and unanswerable arguments against its adoption. But what will the public say to the

spirit which has latterly actuated the majority of the attending members, the illiberal and disgraceful resolution will become one of their standing orders. Be it so: we wish them all the credit and fame which such a resolution is calculated to produce; for ourselves, we can only say that we feel satisfied in having entered our protest against the measure; and although some of the members of this society have most illiberally and unjustifiably attacked this journal by name, in their debates, where no person, not a member, can be entitled to defend it, yet it is our intention to take no notice whatever of such unhandsome conduct, fully persuaded, that the principles on which we act, and the manner in which the journal is conducted, are the best answers to all calumnious accusations from every quarter, and by whomsoever uttered. Of this subject therefore we hope that we may finally take our leave, merely observing, that whatever the society has done for the encouragement of arts, it has not encouraged, WHICH IT OUGHT TO HAVE DONE, but DISCOURAGED us.

We turn from these unworthy subjects to those more befitting the style and character of our work.

This society has since our last, unanimously resolved to present to MR. PETER BARLOW, of the Royal Military Academy, Woolwich, their gold medal and a complete set of their volumes from their commencement; and they have also elected him a perpetual member, for his paper *on Magnetic attraction, particularly as respects the direction of the Compass on ship board, occasioned by the local influence of the guns, &c.*

wisdom of this measure, when they are told that it has been adopted, solely and most pointedly, to discomfit and annoy an individual of the society, against whom some of the *trading artists* and *patent specification mongers*, members of the society, have taken a dislike! *Proh Pudor.* This is the nineteenth century liberality!

The great importance in practical navigation, of being able to ascertain correctly or even approximately the local attraction of a ship's guns, and other iron on the needle, induced Mr. Barlow to make a series of experiments, in order to reduce to uniformity and precision this hitherto mysterious and apparently irregular action.

Besides the paper laid before this society, Mr. Barlow has published a work on the same subject *, which contains in detail, the substance of his paper presented to the Society of Arts, although, it is said, that this last is more explicit than his printed work. The printed work is not susceptible of abridgement so as to be suitable to our pages; and we have not been able to obtain a copy of the paper read before the Society of Arts. It is however remarkable that Mr. LECOUNT (see a preceding paper in the present number,) should have made similar discoveries to Mr. Barlow.

Royal Society.

THE meetings of this Society were resumed on the ninth of November.

Sir E. Home communicated some observations on the influence of the black substance in the skin of the negro, in preventing the scorching operation of the sun's rays;

* An essay on magnetic attractions, particularly as respects the deviation of the compass on shipboard, occasioned by the local influence of the guns; with an easy and practical method of observing the same in all parts of the world, by PETER BARLOW, of the royal military academy, pp. 144.

from which it appears that their deleterious effects are prevented by artificial blackening of the surface of the skin; that perspiration becomes more copious, as is especially remarked in the negro; and in short that the conversion of the radiant matter of the sun into sensible heat, which conversion is effected by the black surface, tends to prevent the scorching effects, and to promote the cuticular secretion.

On Nov. 16, a letter was read from Sir Humphry Davy, on the magnetic effects produced by electricity, which clearly establish the fact, that the galvanic fluid, directed in a proper manner, is capable of communicating magnetic properties to bars of steel.

Nov. 30. Sir Humphry Davy was elected President of this Society, which has given universal satisfaction. On the 7th of December Sir Humphry took the chair, and in a short discourse, pointed out the object of the Royal Society in particular, and its relation to various other scientific institutions assembled for the purpose of pursuing individual branches of enquiry. And he concluded by expressing his confidence that the Fellows of the Royal Society, in all their future researches, would be guided by that spirit of philosophy, awakened by our great masters Bacon and Newton: that sober and cautious method of inductive reasoning which is the germ of truth and of permanency in all the sciences. "I trust," he said, "that those amongst us who are so fortunate as to kindle the light of new discoveries, will use them, not for the purpose of dazzling the organs of our intellectual vision, but rather to enlighten us, by shewing objects in their true forms and colours. That our philosophers will attach no importance to hypotheses, except as leading to

the research after facts, so as to be able to discard, or adopt them at pleasure; treating them rather as parts of the scaffolding of the building of science, than as belonging either to its foundation, materials or ornaments. That they will look, when it shall be possible, to practical applications in science; not however forgetting the dignity of their pursuit, the natural end of which is to exalt the powers of the human mind, and to increase the sphere of intellectual enjoyment, by enlarging our views of nature, and of the power, wisdom, and goodness of the Author of nature.

Dec. 14. A paper was read, detailing the composition and properties of some new compounds of chlorine and carbon discovered by Mr. Faraday.

The Philosophical Transactions for 1820, part II. have been published since our last. They contain the following papers.

On a New Principle of constructing Ships in the mercantile navy, by Sir ROBERT SEPPINGS, F.R.S.

The great advantages derived from the plan of Sir R. Seppings, are the attainment of additional strength, decrease of the consumption of materials and difficulties of construction, protection from worms externally, and from vermin internally, and facility in stopping leaks.

On the Milk Tusks and Organ of Hearing of the Dugong, by Sir E. HOME.

Upon the different qualities of the Alburnum of spring and winter felled oak trees. By T. A. KNIGHT, esq F.R.S.

The practice of felling trees *in winter* seems now to be universally admitted as the best for all timber trees. But as the value of oak-bark is so important, and as that cannot be obtained, except by spring felling, it would ap-

pear that this practice in regard to the oak, is not likely soon to be dispensed with. On the subject of timber we recommend not only this paper to our readers, but a treatise on Carpentry, lately published, by Mr. Tredgold, where the qualities and mode of felling timber are amply and scientifically treated.

On the mode of Formation of the Canal, for containing the Spinal Marrow, and on the form of the Fins (if they deserve the name) of the Proteosaurus. By Sir E. Home, Bart.

Some experiments on the Fungi which constitute the colouring matter of the Red Snow discovered in Baffin's Bay, by F. Bauer, Esq. F.R.S.

Some account of the Dugong. By Sir T. S. Raffles.

Observations on the human Urethra, showing its internal structure, as it appeared in the microscope of F. Bauer, Esq.

On the Errors in Longitude as determined by chronometers at sea, arising from the action of the iron in the ships upon the chronometers. By George Fisher, Esq.

An account of a new mode of performing the high Operation for the Stone, by Sir E. Home. Bart.

A Sketch of an Analysis and Notation, applicable to the Estimation of Life Contingencies. By Benjamin Gompertz, Esq. F.R.S.

On the measurement of Snowden by the Thermometrical Barometer. By the Rev. F. J. H. Wollaston, B.D. F.R.S.

The height of Snowdon by this paper is 3546,25 feet.

On Sounds inaudible by certain ears. By W. H. Wollaston, M.D. F.R.S.

Particulars respecting the Anatomy of the Dugong, intended as a supplement to Sir T. S. Raffles's account of that animal. By Sir E. HOME, Bart.

On the Compressibility of Water. By JACOB PERKINS, Esq.

An account of this paper will be found in our last volume. The instrument which Mr. Perkins used to perform this experiment he calls a *piezometer*; we cannot avoid thinking that many of the experiments performed by Mr. Perkins are open to serious objections.

Astronomical Observations. By STEPHEN GROOMBRIDGE, Esq. F.R.S.

Royal Society of Edinburgh.

THIS Society resumed its sittings on the 6th of Nov. last. A paper by Dr. Butter, was read, *On the spontaneous Dispersion of Cataracts.*

Nov. 20. A paper by Dr. Dyer was read on the nature and properties of Alcohol, and on some Instruments for measuring the specific gravity of mixtures of Alcohol and Water. 27. Sir Walter Scott, Bart. was elected president. For the *Physical Class*, Sir G. Mackenzie, Bart. President. For the *Literary Class*, Henry Mackenzie, Esq. President.

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*On Sympathy.**

THE doctrine of sympathies is by no means so well understood, or attended to, as could be wished; for by

* From the *Family Cyclopædia*, now publishing by MR. JENNINGS.

the most accurate attention to, and a knowledge of, sympathies, we have no doubt, that the healing art may be considerably improved, and our corporeal and mental maladies more speedily and certainly cured.

Our various, particular corporeal sympathies, can hardly have escaped the attention of the most common observer. From the extensive sympathy of the *stomach*, with almost every part of the body, we find that this most frequently suffers, and is affected in some way or another, in almost every disease, whether general or local, provided the diseased action is in any degree considerable. Nor is this sympathy of the stomach confined to bodily affections; those of the mind having, very often, even greater, and more immediate influence, than any corporeal sympathy whatever: such are the sympathies propagated from the brain to the stomach, by fear, grief, terror, &c. The corporeal as well as the mental sympathies of the sexes, are no less powerful than striking; the sympathy of the stomach with the brain; of the stomach with the liver; of the intestines with the stomach; and the skin with the parts below it, may also be mentioned as particular sympathies, which are also more or less striking, and which observing persons cannot have failed to notice.

The sympathy of the stomach with the palate, relative to food and drink, is not among the least of the extraordinary sympathies which we possess. When the stomach is in good health, the promptings of this sympathy are important, and ought to be attended to; but when *disease* is present, either in the stomach itself, or in the tongue and mouth, this sympathy often produces singular desires and inclinations for aliment. These desires and inclinations ought sometimes to be gratified; but at others, their gratification is often attended with considerable mischief

Many of our errors relative to food in dyspepsia, and other diseases, originate in a neglect of proper discrimination in the choice of it: for it very often happens that our sympathies prompt us to desire certain food, and even to relish it; yet, soon after such food enters the stomach, a variety of unpleasant symptoms frequently arise. We have elsewhere noticed this circumstance, but it cannot be too strongly impressed upon the reader's attention. Persons too often suppose, merely because they *relish* food, that it must be proper for them; in many diseased states of the stomach, no opinion can be more erroneous.

From a consideration of the general sympathy which all the parts of the body possess; and from the supposition, perhaps a just one, that, if the action of one part is in excess, the action of another part is proportionably diminished, many important conclusions may be drawn, which will be of great practical utility. Hence in diseases affecting the vital organs, or the abdominal viscera, particularly those attended with inflammation, it has been for a long time customary to excite the action of the exterior parts of the body, in the immediate neighbourhood of the diseased organ, by blisters, fomentations, &c. But from a valuable paper, lately published by Dr. KINGLAKE, in the *Medical Journal, on Transferred Irritation*, it appears very probable, that a blister, or other powerful stimulant applied to the arms, or legs, promises a more successful result, by *transferring* the disease to a less vital, and, consequently to a part from which less danger can be likely to ensue. Attention to these *bodily* sympathies, is, doubtless, of importance; but attention to our *mental* sympathies is not less necessary, both to our moral and physical well-being. Our corporeal sympathies relate, for the most part, only to, and have connexion with,

ourselves individually; but our mental sympathies, it is well known, extend to, and influence those around us. These, which originate primarily, we are disposed to think, from our corporeal sympathies, have aptly enough been termed the GRAND SYMPATHIES of our nature. On these grand sympathies, and their due regulation and employment, does our happiness or misery, very materially depend. Independent of all education, or, at least, of any particular education, these sympathies belong to us as animated beings. It is the particular province of the understanding, to give them a proper direction, in order that they may be productive to ourselves, as well as to society, of the greatest possible quantity of good. It is in the misdirection, or in the abuse of our sympathies, that the crafty and designing have been engaged, in all ages, to mislead and deceive us. It is by artfully engaging our sympathies, that the interested or the weak advocates for superstition, have involved mankind in the grossest errors and absurdities; and it is only by a resolute determination to preserve intellectual freedom and independence, that our sympathies can be rendered subservient to the greatest and noblest purposes. SEE AFFECTION, MIND, &c.

Upon our *mental* sympathies depend also the impositions and frauds which have been from time to time practised by the professors of animal magnetism; but it is now well known, that such frauds can only be successfully played off upon the weakest, and most credulous of mankind. SEE FASCINATION.

Linnean Society.

Some further particulars have been communicated to this Society, respecting the new and extraordinary genus *Rafflesia*, lately received from Sumatra. Part of a descriptive catalogue, by Sir T. S. Raffles, has been also read, of a zoological collection made for the East India Company in Sumatra and its vicinity, by his direction, with many interesting notices, illustrative of the natural history of those countries. The animals described in the part of the paper which has been read, are the following apes: *Simia Satyrus*, called in Sumatra Oran Pandak; *Simia Siamang; Simia Lar*, or Oongka Etam: of the sensibility of this last, it is said, that one being turned out of the house in consequence of some offence, twice hung itself on a tree; the first time it was discovered and cut down, but succeeded in its second attempt in destroying itself; another *Simia*, called Bruh by the natives, is employed near Bencoolen, to gather cocoanuts, the ripest of which he selects, and pulls no more than he is ordered. Other species are named Chingkau, Simpai, Kra, and Lotong. *Lemur tardigradus*, *Galeopithecus volans*, *Vespertilio Vampyrus*, *manis pentadactyla* and *canis familiaris;* this last is said to be a variety resembling the Australasian, which abound in the forests, and are said to hunt in packs.

Cambridge Philosophical Society.

A paper has been read at this Society by Dr. Clarke, upon a remarkable formation of native natron in Devon-

shire. Dr. C. has discovered, that the supposed alabaster, Soros, brought by Mr. Belzoni from Upper Egypt, consists of one integral mass of *Arragonite.* The Rev. Mr. Cecil read a very important paper on the application of hydrogen gas, to produce moving force in machinery; and gave, at the same time, a description of an engine for that purpose, which was exhibited to the Society.'

Andersonian Institution at Glasgow.

We call our readers attention to this Institution with great pleasure.

We are indebted to Dr. Ure, in the preface to his Dictionary of Chemistry lately published, for the following particulars: To the practical applications of science his attention has been particularly directed in conducting that department of the Andersonian Institution destined to diffuse, among the manufacturers and mechanics of Glasgow and its neighbourhood, a knowledge of the scientific principles of their respective arts. Europe affords no similar example of a class composed of several hundred artisans, mechanicians, and engineers, assembling every Saturday evening at eight o'clock, with exemplary decorum to study the scientific principles of the useful arts; to learn the great practical truths of philosophy first revealed by Newton and Lavoisier, made level to their various capacities by familiar descriptions, models, and experiments. By a steady prosecution of this expanded system of instruction, the auditors have progressively increased in numbers and importance, so that within the last

twelve years Dr. Ure has delivered twenty-one courses of lectures to upwards of six thousand students in this department alone.

"The department of the mechanic's class, amounting occasionally to five hundred members, might serve as a pattern to more dignified assemblies. I have never seen any university class so silent and attentive. Though the evening on which the workmen meet be that in which they receive their wages, and when, therefore, they may be expected to indulge themselves in drinking, yet no instance of intemperance has ever occurred to annoy the audience. And even during the alarms of insurrection with which our city was disturbed last winter, the artisans continued, with unaltered docility and punctuality, to frequent the lectures. These courses are especially designed for young artisans, who have only to pay about five shillings in the season, three months. This trifling fee is exacted, in order that the class may include only students actuated by the love of instruction, and willing to make some small sacrifice for it.

"The whole experimental means at present employed in carrying on this *Polytechnic School*, have been derived from the exertions and sacrifices of the professor, and the generous aid and contributions of his pupils. They have supplied him with much valuable practical information on their respective arts, with many curious models and subsidiary instruments for illustration; while he, in return, has expended large sums of money in framing popular representations of the scientific discoveries, and in improvements in which the present age is so prolific. To the mechanics' class a library is attached, consisting of the best treatises on the sciences and arts, with some valuable works on general literature; such as history,

geography, travels, &c. of which they have the exclusive management and perusal."

It is much to be desired that such a society, with similar courses of lectures, were instituted in all the large towns of the British Empire. Of its good political and moral effects, as well as scientific importance, there can be no doubt.

The British Merchants' Seamen's Institution.

MR. JEFFREY DENNIS has published, *A Systematic Plan for bettering the Condition of Owners, Commanders, Officers, Seamen, &c. in the Merchant Service*, which appears to be well deserving the attention of those persons whose interest it professes to consult. It is not consistent with our work, to notice this plan more at large; but we cannot doubt that those who are immediately interested in it will pay all necessary attention to the subject.

On the Inflammability of fixed Oils.

WHEN we reported the chemical particulars of the trial *Severn, King, and Co.* versus *the Imperial Insurance Office*, we could not have anticipated that another, yet more arduous and long contested one, would have taken place in the month of December last; and in which, as well as in the former trial, Messrs. Severn and Co. obtained a verdict; so that the pecuniary claims arising

out of the fire are now, we understand, finally determined: not so the inflammability of fixed oils.

In this last trial, the following gentlemen amongst others were examined for Messrs. Severn and Co. viz. Messrs. Brande, Parkes, Accum, Dalton; Drs. Paris, Henry, Jones, Pearson, Thomson, Davy, &c. For the Insurance-Office, Dr. Bostock, Messrs. Faraday, Taylor, Aikin, Phillips, Daniel Tilloch, Martineau, &c. The evidence appears to have been equally conflicting with the former trial: we shall therefore not detail it. Nor shall we make any observations on the great difference, of opinion and of experience of so many scientific men. There is, however, a sensible paper by Mr. Parkes, in the last number of the Journal of the Royal Institution, which persons interested in the combustibility of oil should consult: but this relates only to the first trial. See also a summary of some experiments on this subject, by Dr. Bostock, in our present Number.

Apricot Trees.

A gentleman of Chichester has now in his pleasure-grounds a few standard apricot trees, of uncommon size. The present possessor recollects his ancestors having twelve or fourteen of them; when they came into his hands, he cut most of them down, as unproductive, never having known them to bear fruit. About four was left, as ornamental trees to the ground, which have begun to produce, within the last six years, an annual and abundant crop: one of these last summer yielded five bushels of large ripe fruit. It appears by the above statement, that standard apricot trees will not bear fruit until 40 or 50 years of age.

Royal Society of Literature.

A SOCIETY of this kind has been announced as now forming under the patronage of His Majesty, outlines of which have been published in the *Literary Gazette*, which, if correct, are not, in our opinion, calculated to serve the general interests of literature, in the way which some of its advocates seem to expect. We, however, are awaiting further details and more correct information.

New Method of working the Pump at Sea.

Capt. LESLIE, of the American vessel the George and Susan, adopted the following simple method of keeping the ship's pumps at work when the sea runs high, and when the crew are not sufficient, or already fatigued. About 10 or 12 feet above the pump, he fixed a spar or small mast, one end of which projected overboard, while the other was fastened to the machinery of the pump. To the end which projected overboard was suspended a water butt, half full. By this simple contrivance, every coming wave, as it raised the water butt, depressed the piston of the pump, and every retiring wave, as the water butt sunk with it, raised the piston again; and thus, without the aid of the crew, the ship was cleared of water in four hours.

Ripening Wall Fruit.

Mr. Henry Davies, of Slough, has published the result of an experiment for facilitating the ripening of wall fruit, by covering the wall with black paint. The experiment was tried on a vine, and it is stated that the weight of fine grapes gathered from the blackened part of the wall was 20lb. 10 oz.; while the plain part yielded only 7lb. 1 oz., being little more than one third of the other. The fruit on the blackened part of the wall was also much finer, the bunches larger, and ripened better, than on the other half; the wood of the vine was likewise stronger, and more covered with leaves on the blackened part.

On the Properties and Strength of Timber.

A Treatise, entitled *Elementary Principles of Carpentry, with an Essay on the Nature and Properties of Timber, illustrated by Engravings,* by Thomas Tredgold, has been lately published, which we strongly recommend to our readers, as a work containing a great variety of practical information. That part of it relative to the nature and properties of Timber, is particularly deserving attention. We present our readers with the following sensible remarks and important data, relative to the properties and strength of many varieties of timber.

To the experienced workman, the general appearance of each variety of wood has become so familiar, and its most obvious characters are so strongly impressed on his memory, that he readily knows them one from another; but nevertheless, the notice of some characters that are peculiar to certain kinds of woods, may be of use es-

pecially to young men, who will find both information and amusement in making collections of specimens, in examining their properties, and in rendering themselves familiar with their uses.

In a section of a tree it clearly appears that the wood is composed of separate layers very regularly disposed round the pith, which is, in general, nearly in the centre of the tree; but the thickness of these layers, is seldom, if ever, perfectly regular.

When examined by a magnifier, the wood appears to consist of fine divisions, like rays spreading from the pith to the bark, with pores between them often empty, but sometimes filled with some kind of vegetable matter. In the resinous woods most of the pores are filled.

Besides the fine divisions, which are often scarcely to be distinguished by the naked eye, there are in some woods, other divisions that are larger; like larger rays passing from the pith to the bark, they are generally of a light silvery colour, and are called the silver grain or larger transverse septa. When a piece of wood is cut so as to pass obliquely through the larger septa or silver grain, it produces that fine flowered appearance, so well known in the oak.

The fine divisions or lesser transverse septa, are common to all woods, except the palm, though in some not very distinct; but some kinds only have the larger septa or silver grain; therefore, this forms a natural character for distinguishing the kinds of wood. They may be divided into two classes: one which has, and the other which has not, the larger septa or silver grain.

Again, in some woods, each annual layer or ring seems to be nearly uniform in its texture, and the line of separation between the layers is not very distinct, being so indistinct in some woods, as to be, as it were, shadows of circles,

nothing real. Mahogany is an example of this structure; the *robininia caragana* is also of this kind.

But in other woods, one part of the layer is nearly compact, and the rest of it presents the appearance of a circle of empty pores; of which we have an example in the ash; it is also remarkably distinct in the arbutus.

There is a third kind, in which nearly all the pores appear to be filled with resinous or gummy matter; and the part of the layer consists of a compact hard and dark-coloured substance; the other part is lighter coloured and softer. All the resinous woods are of this kind.

According to these distinctions, the arrangement of the following tables is made.

WOODS.	CLASS I.—With larger transverse septa.	*Division* I.—Very distinct annual rings, one side porous, the other compact.	Oak
		Division II.—Annual rings not very distinct, and their texture nearly uniform.	Beech Alder Plane Sycamore
	CLASS II.—No larger transverse septa.	*Division* I.—Annual rings very distinct, one side porous, the other compact.	Chesnut Ash Elm False Acacia
		Division II.—Annual rings not very distinct, and their texture nearly uniform.	Mahogany Walnut Teak Poplar
		Division III.—Annual rings very distinct, pores filled with resinous matter; one part of the ring hard and heavy, and the other soft and light coloured.	Cedar of Lebanon Larch Yellow fir White fir American Cedar

A Table of the Properties of different kinds of Timber.

t three columns of this table oak is made, the standard of comparison.

FRANCE.

In conformity with an ordinance issued by the king of France, on the 25th of November, 1819, arrangements have been made at the *Conservatory of Arts and Trades*, for giving public instruction gratuitously on the application of the sciences to the industrious arts. There will be three courses of instruction, namely, 1st. Mechanics; 2d. Chemistry, applied to the arts; and, 3d. Economy in Trade and Manufactures. The first course will be superintended by M. Charles Dupin; the second by M. Clement; and the third by M. Say, author of the treatise on Political Economy. See the article *Anderson's Institution of Glasgow*, in the present number.

French Academy of Fine Arts.

The pictures and statues sent from Rome by the students of the French academy were lately exhibited.

A marble statue by M. Ramey has excited particular interest.

A Young Huntress, by M. Cogniet, presents much truth and harmony of colouring.

In an historical landscape by M. Michallon, the subject, *Œdipus and Antigone seeking refuge in the wood sacred to Eumenides*, the artist has contrived a contrast which produces the grandest effect. On one side is the

temple of the infernal divinities, surrounded by a gloomy wood, impenetrable to the rays of the sun; on the other appears a landscape rich in architectural monuments, over which is diffused a brilliant and reddish mass of light. The picturesque effect of this back-ground calls to mind the noble compositions of Poussin. The sombre genius of Salvator Rosa seems also to have inspired the artist in his mysterious representation of the temple of the Furies.

Theseus killing the Centaur Bianor, by M. ALLAUX, is a large picture; it represents one of the scenes so admirably described by Ovid, in his twelfth book of the Metamorphoses. The figure of the centaur is drawn in a bold style, and well coloured; that of Theseus not quite so good.

Ulysses recognised by his Dog, is also a large picture, by M. HESSE. The figure and head of Ulysses are extremely beautiful, and the accessaries well done. The back-ground is a rich landscape, with an harmonious effect of light.

Oath of the Seven Chiefs, is a sketch of the same artist, from the history of the Theban war, in which there is considerable fire and energy in the group: and it will probably furnish the author with a subject for an excellent picture.

HOLLAND.

THE following prize questions have been announced by the Haerlem Philosophical Society. Memoirs on them will be received till Jan. 1, 1822.

What information has been obtained respecting the nature, habits, and production of those little insects which are so injurious to plants cultivated in hot-houses; and what method would such information suggest, for preventing the propagation of such insects, or for extirpating them?

Has experience clearly proved, that there are certain trees and plants, particularly of the most useful species, which cannot vegetate when close to each other? and, in that case, what experiments can be adduced as proofs? Can this antipathy between some species be any way accounted for by what we know of the nature of plants; and what useful information does it supply us with for the cultivation of trees and useful plants?

What are the insects most hurtful to trees and shrubs in forests? In what consists the injuries they produce? What are the remedies proper to prevent such injuries, or to remove them?

How far are we acquainted with the economy of moles, and what means does it suggest as most efficacious for ridding lands of them, when they prove destructive? Are there, on the contrary, any observations tending to prove that moles are ever useful by destroying other vermin; and how may it be known when moles are to be tolerated?

Dry yeast having been substituted for moist in brew-

ing, the society demands a comparison, founded on chemical analysis, of the nature of yeast, both in the moist and dry forms; and a statement of their relative qualities? That a method be pointed out by which liquid yeast may be freed from the bitter and disagreeable flavour occasioned by the hops used in brewing? That some means be shewn by which liquid yeast might be preserved for at least some time, so as not to lose the power of fermenting dough?

How far is it actually demonstrated that fumigation with chlorine gas has prevented the propagation of contagious diseases? What are the contagious diseases in which it ought to be tried? and what ought to be principally observed in such experiments? Is there any reason to expect more salutary effects from any other method hitherto employed or proposed for this purpose?

How far does the physiology of the human body afford just grounds for supposing, or how far has experience satisfactorily proved, that oxygen gas is one of the most efficacious remedies for recovering persons who are drowned, suffocated, or in a syncope? and what are the most prompt and most certain methods to be employed for this effect?

What is to be considered as justly proved with regard to the gastric juice of the human body, and its influence on the digestion of food?

GERMANY.

Mr. Dreher, an ingenious turner at Vienna, has greatly improved the copying machine, by an extremely judicious

simplification of the mechanism, and thereby affording a great accommodation to merchants and travellers in particular. This *Pocket Copying Machine*, by which letters and writing of all sizes, even folio, may be very quickly copied, consists of a press, four inches long, with a small cylinder which contains pens and ink. The whole apparatus may be conveniently carried in the pocket, and the price is very moderate.

Nuremberg.

THE first number of a magazine of arts, manufactures, and commerce, to be published monthly, appeared at this place on the first of January last, by HERRN BESSOLD: it consists of one sheet, and is accompanied with four lithographic engravings. The subscription is six guilders per annum, or 36 kreutzers per number. We hope to be enabled to present our readers with some useful details from this work.

From the same source of correspondence we learn that a coal mine has been lately discovered at Hamberg, about sixty miles from Nuremburg; we understand however that the coal is of an indifferent quality.

PRUSSIA.

THE Royal Academy of Sciences of Prussia has proposed the following question. To give a mathematical explanation of the luminous coloured rings which are

sometimes observed round the sun and moon, agreeing with experiments on light, and the constitution of the atmosphere, and with observations of the phenomena made with all the precision possible. The memoir to be sent in before the expiration of March, 1822. The prize 50 ducats.

SWEDEN.

M. Grauer, an officer in the Swedish service, has recently discovered a group of Islands, in the great South Sea, or pacific ocean, hitherto unknown: to the largest he has given the name of Oscar, but does not state exactly their situation. Considering the vast extent of this ocean, and the comparatively few navigators who have traversed it, the probability is, that many Islands, and groups of Islands, do there exist, of which we have no knowledge.

AFRICA.

The Rev. John Campbell, who published some years since an account of his mission to the Cape of Good Hope, and many parts of the interior of Africa, has visited a second time those regions, and penetrated considerably further than he did on his former mission. Upon proceeding to Lattakoo in 1819, to which he had penetrated on his first journey, and which is about 900

miles north of the Cape, he found that the inhabitants had removed and formed a new settlement, which he calls New Lattakoo. Thence he proceeded in a north easterly direction for more than a hundred miles, passing through two towns, one of which *Mashew*, he estimated to contain from twelve to fifteen thousand inhabitants: here much land was under cultivation. Thence Mr. Campbell, proceeding still to the north eastward for more than one hundred miles farther, arrived at Kurrechane, the principal town of the Marootze tribe, containing about sixteen thousand inhabitants. The people of this town possess a knowledge of arts, superior to any tribe which Mr. Campbell has hitherto seen. They smelt iron and copper ore which are procured in the neighbouring mountains. There are many founderies in this town, but they were guarded with so much jealousy, that our traveller was not allowed to enter them. It appears to be the Staffordshire as well as Birmingham of that part of South Africa. They manufacture pottery, and in the shape and painting of their articles, shew a superior degree of taste. They appear also to excel in making baskets: the walls of their houses are ornamented with paintings of elephants, camel-leopards, shields, &c. The height of the hills, the smooth regularity of their outline, and the indentations upon their sides, afford sufficient indications of the presence of chalk, lime, &c. and of a secondary and, consequently, a fertile country. From the distance travelled, it is supposed that Kurrechane must be in about lat. 24 south, and not a very great distance from the eastern coast of Africa. Some of the rivers in the neighbourhood flowed to the westward, while others took an east or a S. S. E. direction. Several large towns were reported to Mr. C. to lie to the eastward of Kurrechane; the smoke of one or two of them he saw.

Mr. C. obtained permission from the assembly of the people of Kurrechane, to send missionaries there, and a promise that they should be protected.

On the Inflammability of Whale Oil.

Dr. Bostock has published an account of some experiments on this subject, in *Thomson's Annals*, which are deserving attention.

The quantity of oil operated upon, was generally from 25 to 30 gallons; the fluid was contained in a boiler three feet long, one foot six inches wide, and one foot six inches deep; fire place 14 inches long, three inches wide; the bars three inches from the bottom of the boiler. The oil occupied about two thirds of the vessel; it had a concave bottom, and was closed air-tight, except that a tube of half an inch diameter was inserted into its upper part. The temperature employed was 360°, and the oil was carefully kept at that degree of heat during 12 hours each day. In the different trials, the process was continued for 22, 23, 26, 38, and 55 days respectively, until, in one instance, it was extended to 68 days. The substance employed was the whale oil of commerce in the state of purity in which the article is usually exhibited for sale.

When the oil was examined, after having been kept at the above temperature for the period above stated, its physical properties were considerably altered; its colour was nearly black, its consistence thick and tenacious, and its odour empyreumatic. When heat was applied to it in this state, after it had been cooled down to the temperature of the atmosphere, the first effect was to render it more fluid; and, at higher degrees of heat, its consistence seemed to be considerably less than that of recent oil. While the oil was in the boiler, and at the temperature of

360°, an internal motion took place among its parts, that seemed to arise from some portion of it being converted to the aeriform state and suddenly condensed; this was indicated by a peculiar sound emitted from the vessel analogous to the simmering of water before it is raised to the proper boiling point. It was observed that the simmering diminished as the oil exceeded the temperature of 400°; and, after it had acquired the heat of about 450° it was no longer heard.

But the most material alteration in the oil, was the property which it had acquired of emitting vapour when it was subjected to temperatures which would have had no effect of this kind upon recent oil. Both the quantity of vapour, its chemical composition, the mode of its generation, and the degree of the thermometer at which it first appeared, were very different in the different experiments; and there does not appear sufficient data for forming a correct opinion upon any one of these points. One of the circumstances which seemed the most favourable for its production, was the rapidity with which the fluid passed through a certain range of temperature. Oil, for example, which was steadily kept at 360, although it had acquired the dark colour, seemed to produce little aeriform fluid of any kind, with perhaps the exception of a portion of carbonic acid; and there is some reason to suppose that it might bear even a higher temperature, provided the heat be cautiously applied. But if, on the contrary, the heat be more rapidly raised, a copious discharge of an aeriform fluid takes place, which essentially consists of inflammable and aqueous vapour mixed in variable proportions. The total amount of vapour emitted, the proportion of the aqueous to the inflammable part, and the chemical nature of the latter, have not been correctly ascertained; nor is it known whether any thing is procured which is entitled to the

technical appellation of gas. It may however be stated generally that the quantity of vapour is large; that the proportions of ingredients vary in different parts of the experiments, and that the aqueous is more considerable than the inflammable part.

This appeared by bringing a cold body in contact with the vapour, and the condensation frequently was observed to take place merely by the ordinary temperature of the atmosphere: in this case, the inflammable part was left in a highly combustible state. The difficulty with which this inflammable vapour is condensed was strikingly illustrated by one experiment, in which the oil vapour was passed through a worm tube, 23 feet in length: by this means the aqueous part was entirely removed, and the residue burned with a continuous bright flame. The water collected in this case was strongly acidulous, in consequence, as it appeared, of the copious generation of acetic acid.

In most of the experiments the emission of inflammable vapour was scarcely perceptible below a temperature of 400°; but in one instance, where the oil, after having been in the boiler for 55 days, was suffered to cool to the temperature of the atmosphere, and then heated by a brisk fire, a quantity of vapour was generated below 210°, (the degree at which the graduation of the thermometer commenced) which, by the application of a lighted taper, exploded with some violence. It appears, from general observation, that when the temperature of oil was raised to about 420° or 430°, the proportion of the aqueous vapour is more considerable. If the temperature be further raised to about 480°, the proportion of the inflammable to the aqueous vapour is increased; while, at still higher temperatures, above 500°, the inflammable vapour again predominates. With respect to the phenomena

which the mixed vapour exhibits during combustion, it may be remarked that its inflammation is not attended with detonation; when the aqueous part prevails, the flame is quickly extinguished; but that, in proportion as it is freed from the aqueous vapour, it burns with a considerably dense and brilliant flame.

Another effect, which appeared to result from the long continued application of heat, was, that the oil had its boiling point lowered; or, to speak more correctly, that below the temperature which is generally regarded as the boiling point of recent oil, the heated oil was rapidly converted into an inflammable vapour, but of a different kind from that procured at lower temperatures; the vapour procured from the boiling oil containing less water, and having a highly offensive and most penetrating odour; whereas the former vapour had comparatively little smell, and that not peculiarly disagreeable. This change generally took place at about 580°; it appeared to consist in the vaporization of the residual fluid in the boiler; but it was not strictly entitled to the appellation of boiling, because it does not appear, that, by condensing the vapour, a fluid could be re-produced similar to that from which it was procured.

In one of Dr. Bostock's experiments a species of ebullition occurred at a much lower temperature, about 460°, the fluid being violently projected, in considerable jets from the vent-pipe, to the height of nine feet, or more. Dr. B. however, considers this not as the effect of the rapid volatilization of the entire fluid, but as depending upon the more volatile parts being suddenly converted into vapour.

These experiments were performed at the manufactory of Messrs. Taylors and Martineau, in the presence of several scientific gentlemen; among others, Mr. Children,

Mr. Aikin, Mr. Daniell, Mr. R. Phillips, and Mr. Faraday.

It is to be regretted that Dr. Bostock has not stated the kind of thermometer used in these experiments, and in what part of the vessel of oil it was placed. In such inquiries, these things, particularly the last, are of importance to be known.

Recent Patents for 1821.

To John Winter, of Acton, Middlesex, Esq. for certain improvements on Chimney Caps, and the application thereof. —Sealed 7th November—Two months for Inrolment.

To Thomas Dyson, of Abbey Dale, Sheffield, York, Scythe Manufacturer, for his improvements of Plain Irons, and Turning Chisels.—Sealed 11th November—Two months for Inrolment.

To William Kendrick, of Birmingham, in the county of Warwick, Chemist, for his combination of apparatus for extracting a tanning matter from Bark and other substances containing such tanning matter.—Sealed 5th December.—Four months for Inrolment.

To Thomas Dobbs, of Smallbrook Street, in the county of Warwick, Plater, for his mode of uniting together, or plating tin upon lead.—Sealed 9th December.—Two months for Inrolment.

To John Moore the younger, of Castle Street, Bristol, Gent. for a certain Machine or Machinery or Apparatus, which may be worked by Steam, by Water, or by Gas, as a moving power.—Sealed 9th December.—Two months for Inrolment.

To George Vaughan, of Sheffield, in the county of York, Gent. for his Blowing Machine, on a new con-

struction, for the fusing and heating of Metal, smelting of Ores, and supplying blasts for various other purposes. —Sealed 14th December.—Six months for Inrolment.

To William Mallett, of Marlborough Street, Dublin, Locksmith, for certain improvements on Locks, applicable to Doors and to other purposes.—Sealed 14th December—Six months for Inrolment.

To Andrew Timbrel, of Old South Sea House, London, Merchant, for an improvement in the Rudder and Steerage of a Ship or Vessel.—Sealed 22d December.—Six months for Inrolment.

To Sir William Congreve, Bart. of Cecil Street, Strand, London, for certain improvements in Printing in one, two, or more colours.—Sealed 22d December.—Six months for Inrolment.

To William Pritchard, of Leeds, in the county of York, Engineer, for certain improvements in an Apparatus calculated to save Fuel, and for the more economical consumption of smoke in shutting fire doors and air flues in steam engines, boilers, drying pans and frewing pans, and other fire doors and air flues.—Sealed 22d December.—Two months for Inrolment.

To Marc Isambard Brunel, of Chelsea, in the county of Middlesex, Civil Engineer, for his Pocket Copying Press, and also certain improvements in copying presses —Sealed 22d December—Six months for Inrolment.

1821.

To Abraham Henry Chamber, of Bond Street, in the county of Middlesex, Esq. for an improvement in the Manufacture of a Building Cement, Composition, Stucco or Plaster, by means of the application and combination of certain known Materials hitherto unused (save for experiment) for that purpose.—Sealed 15th January.—Six months for Inrolment.

To John Frederic Daniell, of Gower Street, Bedford Square, in the county of Middlesex, Esq. for certain improvements in Clarifying and Refining Sugar.—Sealed 15th January.—Six months for Inrolment.

To Robert Salmon, of Woburn, in the county of Bedford, Esq. for certain improvements in the Construction of Instruments for the relief of Hernia and Prolapsis, which instruments, so improved, he denominates scientific principled, variable, secure, light, easy, elegant, cheap, and durable Trusses.—Sealed 15th January.—Six months for Inrolment.

To Charles Phillips, of Albemarle Street, Piccadilly, in the county of Middlesex, Commander in the Royal Navy, for certain improvements in the Apparatus for propelling Vessels, and an improvement in the construction of Vessels so propelled.—Sealed 19th January.—Six months for Inrolment.

To James Ferguson Cole, of Hans Place, in the parish of St. Luke's, Chelsea, in the county of Middlesex, Watch and Chronometer Maker, for an invention of certain improvements in Chronometers.—Sealed 27th Jan. —Two months for Inrolment.

To John Roger Arnold, of Chigwell, in the county of Chigwell, in the county of Essex, Chronometer and Time-piece maker, for an invention of a new or improved Expansion Balance for a Chronometer.—Sealed 26th January—Two months for Inrolment.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT.

Murray's Smoke consumer.

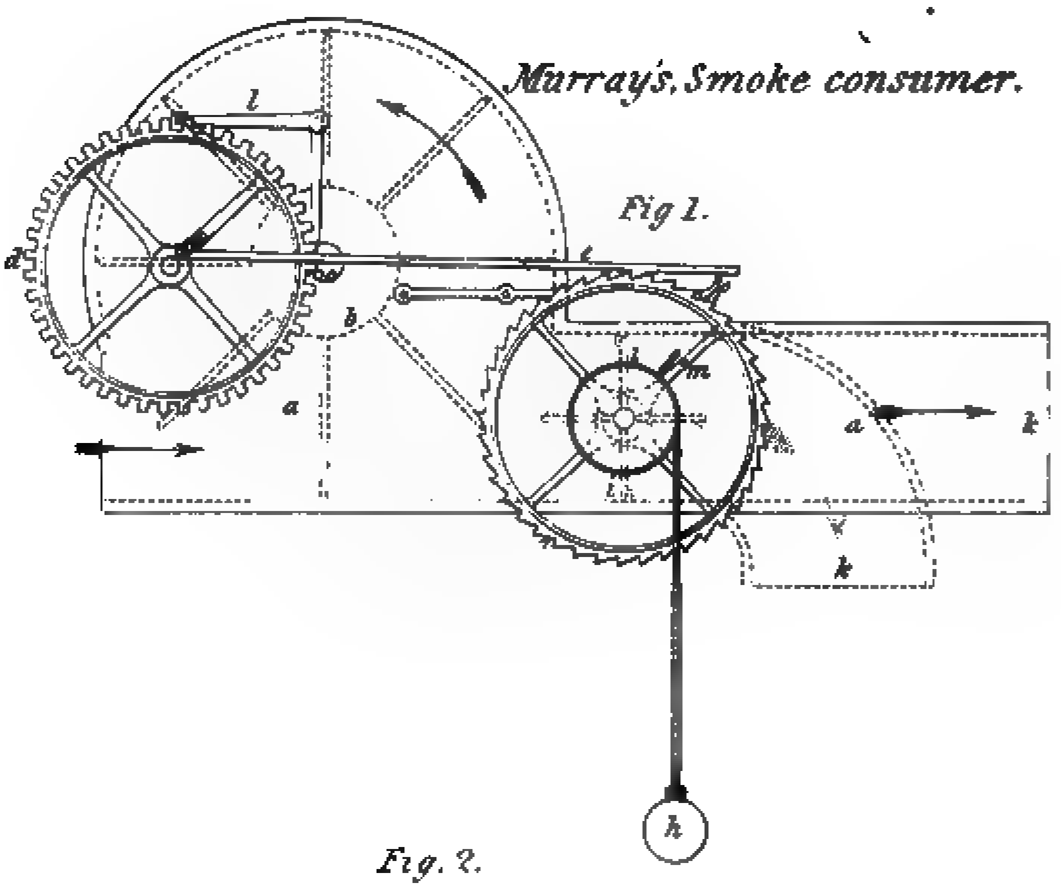


Fig 1.

Fig. 2.

Malam's Gas Meter

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. VIII.

To JOHN MALAM, *late of Romney Terrace, Horseferry Road, Westminster, but now of Wallington, Lancashire, for certain Improvements on Gas Meters.*

COAL Gas being extensively employed for the purpose of illumination, as a substitute for oil, it is an object of considerable importance to the proprietors of gas works, to ascertain with tolerable accuracy the quantities consumed by the respective establishments which they supply, in order to charge their actual consumption of gas according to the number of gallons used, instead of the number of burners employed.

For this purpose several machines have been invented to register the quantity of gas which has passed through the tube in its progress to the burners. One of these contrivances, the patentee in his specification refers to, as his former invention (described in the 37th Vol. of the Transactions of the Society of Arts,) being a gas meter, on exactly the same principle and construction as his

Patent Rotatory Steam Engine (see page 93, Vol. I. of this Journal,) consisting of a cylinder divided into compartments, enclosed and revolving within an external cylinder, both of which are about half filled with water. The gas enters through the hollow axis, and is conducted to one side only of the inner cylinder, where, by its elastic force, exerted against the water downward, and the partitions of the vessel upward, the cylinder is made to revolve. By this means, as the respective compartments become again immersed in the water, the gas is expelled and proceeds forward through the tubes to the burners. The number of revolutions which the cylinder is thus made to perform by the passage of the gas through it, and, consequently, the quantity of gas which has passed, is noted by an index moving upon a dial-plate, turned by a train of wheels connected to the axis of the inner cylinder.

The subject of the present patent is an improvement upon the foregoing, in which the quantity of gas which passes is registered by an index and dial-plate as above; but the interior construction and action of this gas meter are essentially different. Plate IV. fig. 1. exhibits a section of the patent improved gas meter; *a*, is a pipe conducting from the gas-holder, or from the street main into the gas meter, for the purpose of passing the gas to be measured; *b*, is a box or vessel formed like bellows, with the upper flap rising and falling upon a joint or hinge, the sides, of course, are to be of a flexible material, as leather, cloth, &c. luted and secured at the edges, which is to be prepared with the essential oil, obtained from coal tar, or with animal or vegetable oil mixed with coal tar, so as to render it air-tight, and at the same time protect the texture of the material from being chemically acted upon or injured by the gas. From the box or vessel *b*, the

gas escapes through the aperture *c*, into the outer case *d*, *d*, and thence through the exit-pipe *e*, to the burners. This aperture *c*, is partially closed by the flat plate *f*, suspended or swinging upon the rod *g*, and accommodating itself to the descent of the flap.

The gas in the gas-holder, being acted upon by a certain and uniform pressure, will pass in equal quantities in equal spaces of time through a given aperture. The width of the passage through the aperture *c*, will be determined and regulated by the elevation of the flap; the weight of which is supported or balanced by the force of the gas; both the weight and the force being in general unchangeable, the width of the passage, and consequently the quantity of gas which passes will be uniform. In order to register the quantity thus passed, a set of connecting rods or arms, one end of which is joined to the flap or lid of *b*, is carried up as shewn at *h*, *i*, *k*, for a purpose hereafter to be explained. The cylindrical box *l*, supported and fixed upon legs, *m*, *m*, contains a clock movement, or maintaining power, consisting of a spring in its barrel, with a band or chain acting upon a fusee, and a train of wheels, pinions, and a balance wheel, as usual in time pieces. This clock-movement gives motion to an axle carrying the small excentric wheel or a crank *n*, for the purpose of raising the lever *o*, which has its fulcrum on the axle of the wheel *q*, and rests upon the periphery of the excentric wheel. When the lever is thus raised a small spring catch *p*, attached to it, takes into the teeth of the wheel *q*, and when the lever again descends, the catch drives the wheel a short distance round; another spring *r*, holds the wheel as the lever again rises, and in this manner, by many revolutions of the excentric wheel *n*, raising and lowering the lever *o*, the wheel *g*, is driven entirely

round. A pinion upon the axle of *q*, takes into the wheel *s*, which carries the hand or index round a graduated dial-plate not shewn, and thus the quantity of gas which has passed through the aperture *c*, under the certain pressure and circumstances before-mentioned, becomes noted or registered by the dial.

If, however, the pressure of the gas should not be uniform, the flap of the box or vessel, *b*, will be raised or depressed accordingly, as shewn by the dotted lines. In this event, the connecting rods or arms, *h*, *i*, *k*, will so act upon the lever *o*, as to cause it to move through a greater or less arch, and hence to drive a greater or less number of teeth of the wheel *q* forward. Upon the arm, *k*, is a stop, *t*; which, when the flap of *b* descends and contracts the passage of the gas, will, by the connection of the arms, *h*, *i*, *k*, be raised so high as to prevent the lever from being acted upon by the excentric wheel, during a part of its revolution; consequently, under these circumstances, the arch described by the lever will be smaller, and the progress of the registering wheels less. But when the flap of the box *b* is raised, and the quantity of gas discharged greater, then the arm *h* will ascend, and the arm *k* descend, and the stud *t* be brought sufficiently low to enable the lever *o* to be acted upon by the periphery of the excentric wheel, during its entire revolution; by which the arch described by the lever will be greater, and the progress of the registering wheels greater also. The length of the rod or arm *k* may be altered and adjusted by a nut, *v*, having a right and left screw.

In order to stop the clock movement when the supply of gas is stopped, a paul lever, *u*, is brought up by the rising of the rod *k*, for the purpose of locking the excentric wheel. To prevent the passage of the gas through the machine when the maintaining power is exhausted,

and the movement requires winding up, the following contrivance is made use of. Upon the axis of the fuzee of the maintaining power, is a pinion, which takes into a toothed arch or rack, shewn by dots, *w*, *w*, as being on the reverse side of the cylinder, *l*. This rack, by the operation of winding up the movement, is carried back; but as the movement goes down, the rack advances, by which a tooth, *x*, upon its axle, is made to press upon the short end of a lever, *y*, which is, by that means, raised, and made to lift the rod, *k*; at the same time causing the rod, *h*, to press down the flap of *b* sufficiently to bring the aperture *c* in contact with the flat plate *f*, and hence to cut off completely the passage of the gas.

In the event of the leather or other flexible material which encloses the box or bellows *b*, not being found fully to answer, under every circumstance, it is proposed to form the box of metal, and to turn down the edges of the lid or flap into a groove filled with water, so as to enclose the gas by what is called a water joint, and allowing it to pass through the aperture *c*, the top of the box or flap being connected by the rods to the clock movement, as above described.

The specification proposes two other modes of producing a maintaining power, or rotatory motion, instead of the clock movement; one of which is, by passing the gas from the box or vessel *b*, through a pipe, to the curved compartments of the revolving cylinder, as first mentioned, so as to operate in a similar manner to the steam in passing through the revolving steam engine, when, by attaching a train of wheels to the axle, with an index and numerical dial-plate, the rods being connected to the flap and to the movement, the quantity of gas which has passed through the apparatus will be known. The other contrivance is, instead of discharging the gas

from the box or vessel *b*, through the aperture *c*, to make a passage or opening through the joint or hinge of the flap, which passage is to be wedge formed, that is, wide above and narrow below, with a piece of metal partly closing the aperture at bottom; so that, as the flap rises, the passage for the exit of the gas becomes enlarged, and, as it falls, the same becomes contracted. The rods, as above, are attached to the flap, and the moving power is produced by the gas passing up a pipe, and through an orifice in a hollow axis into a number of radiant expanding vessels, which are to revolve round the axis, in which, as the gas enters, it causes the vessel of a bellows form to expand; when, by the levity of the gas, it ascends, and brings the opening of another similar vessel to the orifice of the axis, to be, in its turn, charged with gas, as last described. By these means the vessels are raised, and revolve upon their common axis; and each vessel, having reached the summit of its revolution, is collapsed in descending by the weight of its falling flap, the gas being pressed out, thus causing a preponderating weight which brings that side down, and adds the ascent of the filling vessels. It only remains to add, that the patentee proposes to make the metallic parts of the apparatus of iron tinned over, in order to prevent the corroding effects of the gas.

Inrolled, November, 1820.

To GEORGE MILLICHAP, *of Worcester, for an Improvement in Axle Trees and Boxes.*

THIS Improvement suggested in this patent, consists principally in the introduction of anti-friction rollers

within the box of the nave of a carriage wheel, which rollers, with a sliding ring or collar, surround the axle of the wheel, and reduce a considerable portion of the friction that would otherwise take place by the shoulder of the axle working against the collar of the box, as heretofore. The chief novelty and advantage of which improvement the patentee informs us, consists in the placing of the anti-friction rollers at the back of the shoulder of the axle, and in fixing the frame containing them firmly to the axle; and also in the introduction of a moveable ring or collar, between the rollers and the axle, whereby it is conceived that the strain or friction upon the shoulder is essentially lessened, and of consequence the liability of the axle breaking, in a very great degree removed.

Plate V. Fig. 1, exhibits a section of the nave of this improved carriage wheel, in which *a* is the axle, and *b* the box supposed to be cut through the middle longitudinally, and shewing the anti-friction rollers, *c*, *c*, of which there are proposed to be four. The pivots of these rollers work in slits or grooves of the frame *d*, *d*; *e*, *e*, is a loose collar or ring encompassing the shoulder of the axle, and intended to move freely round between the shoulders and the anti-friction rollers. By this arrangement it will be seen that the principal resistance or pressure of the axle at its shoulder will be received by the loose ring or collar *e*, working against the rollers *c*, and hence the friction is taken off, and the bearing made uniform. The nave is secured upon the axle by means of a flanch screwed at the back; between which and the shoulder there are collars of leather, &c. to prevent the escape of the oil or other fluid, with which the axle may be surrounded. At the end of the axle is seen a screwed cap, *f*, with a linch-pin, also to secure the wheel upon the

axle; and on the outside of this, a box, *g*, for oil, which box when attached and secured by collars of leather, &c. is to be filled at the screw-hole, *h*. From this receptacle the oil or other grease flows through grooves in the nave box, and supplies the axle as the wheel revolves.

Anti-friction rollers have been introduced into the box of the nave or a wheel before the present invention; we suppose that the patentee intends to confine his claim of originality and patent-right to placing them at the back of the shoulder, to fixing the frame which carries them, and to the movable collar or ring connected thereto, as above mentioned.

Inrolled, February, 1821.

To WILLIAM DAVIS, *of Bourne, near Minchinhampton, Gloucester, for certain Improvements in Machinery for Shearing or Cropping Woollen and other Cloths, requiring such process.*

THE specification of this Patent describes the improvements herein claimed, as arranged under three heads. First, the application of rotative cutters made of solid metal, not screwed or wedged to a cylinder or bar, as has hitherto been the practical way of making rotative cutters for shearing cloths. Second, the application of rotative cutters in an angular direction across the cloth; the difference between which and the mode of applying rotative cutters hitherto in practice is, that the under cutter, known by the name of the ledger-blade, has been always placed nearly parallel to the length of the cloth to be shorn, or else nearly at right angles to the length of the cloth. Third, the application of beds made elasti-

spiral springs, placed nearly at right angles to the plane of the ledger-cutters.

The fixed cutter-blade is made of sheet steel hardened; the rotative cutters are of solid steel, made with four concave angles, and twisted as a worm or spiral, hardened and ground true. The two cutters are brought together in a frame, and adjusted by screws. These cutters are several of them placed diagonally, as above said, across the machine, under and against the edges of which the cloth is brought to be sheared, by means of carded rollers as usual. The bed is formed of a thin piece of metal, made elastic by tempering, if of steel; or hard rolled or hammered, if of copper. This bed is further rendered flexible or yielding by its attachment to a bending lever, and also by its resting upon the ends of spiral or helical wire springs, adjusted by screws and nuts.

The different parts of the apparatus are not shown in the specification with frame work connected in the forming of an entire shearing-machine; nor does the patentee consider it necessary, as the bars, bands, geering, friction-wheels, pulley-rollers, and levers, form no part of his invention, and the modes of mounting or connecting and combining the above apparatus, for the purposes of shearing or cropping cloth, may be variously contrived with good effect.

Inrolled January, 1821.

To THOMAS DOBBS, *of Smallbrook-street, Birmingham, Warwickshire, for his Mode of uniting together, or plating Tin upon Lead.*

THIS invention consists in coating lead with tin, whether leaden pipes, leaden bars, or lead in sheets, and is per-

formed by the following means. The lead is taken in a heated state, as soon as it can be removed from the mould after casting, or, is heated to about the same temperature. It is then rubbed with rags or tow, a small quantity of melted tin, turpentine, or some other resinous matter being previously distributed upon the lead, in order to flux the tin. By these means a thin plating of tin is made to adhere to the lead, which is then to be placed in a proper mould, the pipe or bar of lead being as a core, and the fluid tin poured in, which will be cast about the lead, and readily attach itself to the coating of tin already adhering to the lead; hence the two metals will become perfectly united.

The process will be nearly the same, whether the lead to be coated is in pipes, bars, or sheets; it being only necessary to observe, that the surface of the lead must be entirely covered with the tin plating before any attempt is made to cast the two metals together. After they are thus united, the pipe or sheet is to be operated upon by the drawing or rolling apparatus in the usual manner.

Inrolled, February, 1821.

To William Pritchard, *of Leeds, Yorkshire, for certain Improvements in an Apparatus calculated to save Fuel, and for the more economical Consumption of Smoke, in shutting Fire Doors and Air Flues in Steam Engines, Boilers, Dyeing Pans, Brewing Pans, and other Fire Doors and Air Flues.*

The patentee observes, it has been found that the admission of air is absolutely necessary to the consump-

tion of smoke in every description of furnace; and that if the doors or air-flues are not closed in proper time, the cold air will cause a more rapid consumption of coal than is necessary or consistent with economy, as well as tend considerably to increase the wear of the boiler. From which circumstances he has been induced to adopt this his simple and new invention, whereby a self-adjusting or self-regulating apparatus is produced which will cause the fire-doors or air-flues to become closed in any required space of time, without depending upon the care of the man who attends to supply the fire with fuel.

The apparatus consists of a small cylinder, placed in any convenient part of the boiler-house, having an air-tight piston to rise and fall within it. At the upper end of the piston-rod a chain is attached, which passes over pullies, and, at its reverse end, is connected to the top of the fire-door or air-flue doors; by means of which connection, when the fire-door is raised, the piston descends in the cylinder by its own gravity; and, when the fire-door is shut down, the piston rises. On the outside of the cylinder is placed a branch-pipe or channel, through which the air passes (as the piston ascends or descends) from the upper to the lower part of the cylinder, and *vice versâ*. In the mid-way of this branch-pipe, is a valve or stop-cock, which may be so adjusted as to suffer the air to pass slowly, or by a very small stream, through the channel; by which means the ascent of the piston is retarded, and hence the entire descent, or closing of the fire-door or air-flues, does not take place until the air is nearly all expelled from the upper part of the cylinder, allowing time for the requisite quantity of atmospheric air to pass into the air-flues, or over the fire, for the purpose of consuming the smoke; which time of closing the

doors is regulated, as above, by the valve or stop-cock, in the branch-pipe.

Inrolled, February, 1821.

To William Acraman, *the younger, and* Daniel Wade Acraman, *both of the City of Bristol, for certain Improvements in the process of forming the materials for Manufacturing Chains and Chain Cables.*

The object of this Invention, is to construct the links of a chain in such a manner, that they may be better calculated to bear an excessive strain, without breaking, than chains of equal weight of metal upon any other construction. The mode of effecting which, is by placing a piece of metal across the middle of the link, for the purpose of keeping its sides from collapsing, when the chain is drawn with any extraordinary force. Two methods of constructing these links are proposed. The first is, by raising upon the pieces, or bars, (of which each individual link is to be formed) conical protuberances (see *a a*, Plate V. fig. 3.) which, when the bar is turned round and welded together into an elliptical ring or link, will meet in the middle, as fig. 4. These pieces or bars of metal, may be formed by forging, or by rolling, the process not being claimed as part of the invention, but only the form.

This form of link, in which the projections or swells meet each other, when the extremities of the bars are welded together in the elliptic figure, is considered by the

patentees as the most perfect and durable, and which, by reason of its great strength and simplicity of construction, is less capable of being injured by accidents, than any other construction of chain now in use.

The second improved mode of constructing links, seems to be with a view to the saving of metal; upon which, the Patentees observe, if the projections or swells on the bars are not sufficiently raised to meet when turned into a link, then it is proposed to pierce holes into the projections so as to form cups to receive the points of a spindle-shaped stay or stretcher, which is to be introduced, at the time the bar is welded together, in the form of a link, Fig. 5:—in order to support the link, and prevent its sides from collapsing by any extraordinary strain, to which the chain might be subjected, as before-mentioned, the spindle-shape is proposed, because that form is less likely to be chipped on its edges, or broken from its bearing; as it is observed that, "in this invention there are no thin edges or angles in the stay liable to be chipped off, worn away, or injured by pressure or strain; which has, in different ways, been the case with all the stays hitherto made."

The link, fig. 4, appears, in its form, to possess the greatest possible strength, and is that which would be best calculated for the construction of chain cables. The second mode, *viz.* the spindle-shaped stay, or stretcher, is so near an approximation to Captain Brown's invention, and to Brunton's Patent Chain Cable, that unless its spindle-form can be proved to be perfectly new, and to possess a considerable advantage over every other form of stay hitherto applied to chain cables, and not subject to the objection of Captain Brown's, it appears to us to be such an

imitation, as will be considered a copy of the former, or an infringement of Brunton's Patent Right.

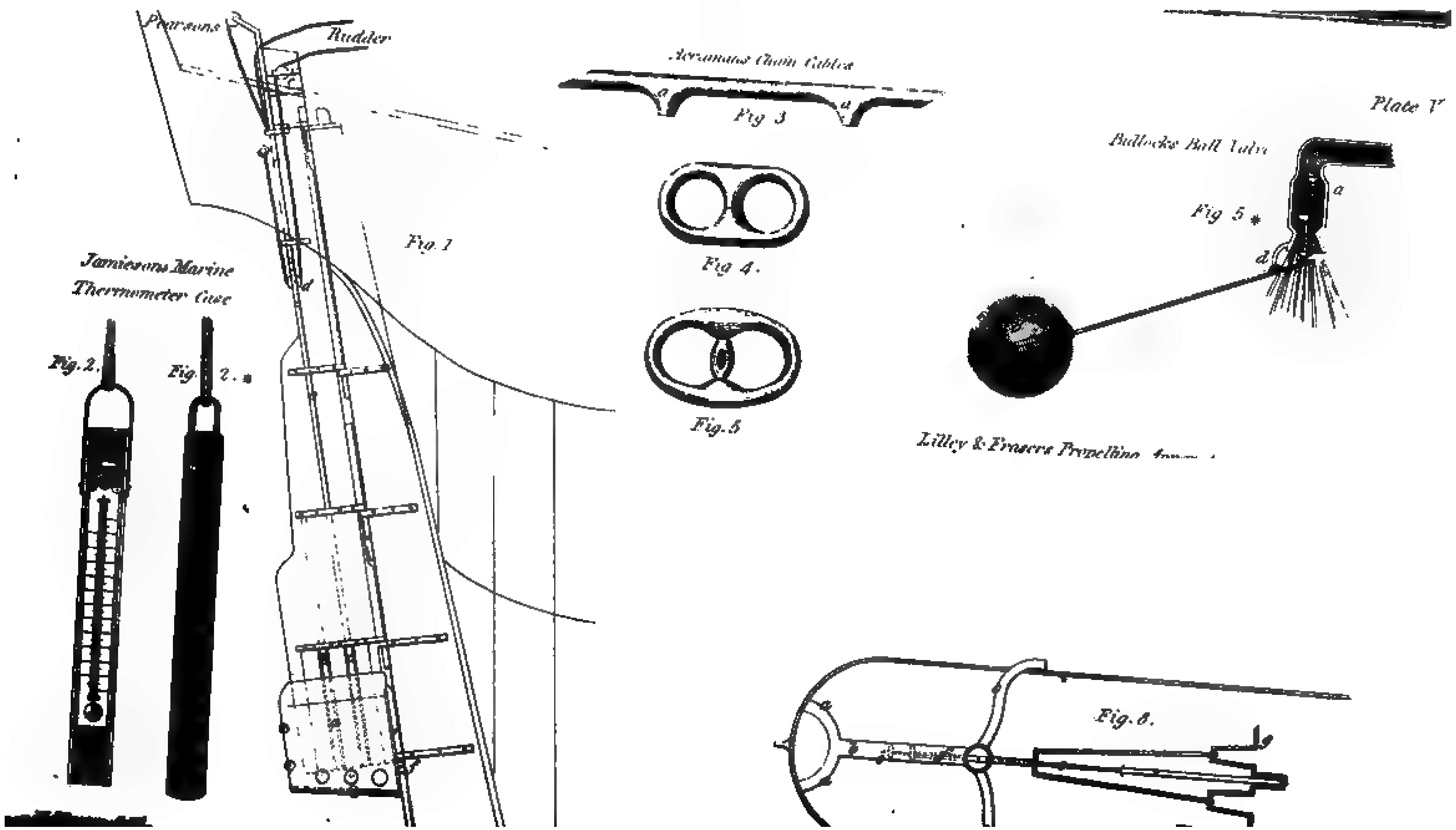
Inrolled, March, 1821.

To THOMPSON PEARSON, *of South Shields, Durham, for an Improvement on Rudders.*

THE Improvement proposed in this Patent, consists of an apparatus by which the lower part of a ship's rudder may be slidden up and down, in order to prevent a hawser or other rope from getting fast between the rudder and stern-post; which is frequently a source of very considerable inconvenience and danger in warping a vessel having a rudder of the old construction. This improved rudder has its lower end formed hollow, with guides and pullies, so as to enable it to rise by sliding up the pintle, and over the solid part of the rudder without being unshipped whenever any force comes under it; and if its own weight should not bring it down again, when the force or obstruction which raised it, is gone, a connecting rod, extending to the top of the rudder, enables it to be immediately reinstated by any person upon deck.

Plate V. fig. 1, represents a side-view of the improved rudder; *a* is the sliding-bottom of the rudder, which in this figure is raised part of the way up; the bottom of the solid rudder being shewn by dots. To the inside of this hollow sliding-part, are attached the lower ends of metallic rods, or conductors, *b, c,* on both sides of the rudder, which slide in grooves, and are cased over where represented by dotted lines. The conducting rods *c,* extend to the top of the rudder, for the purpose of

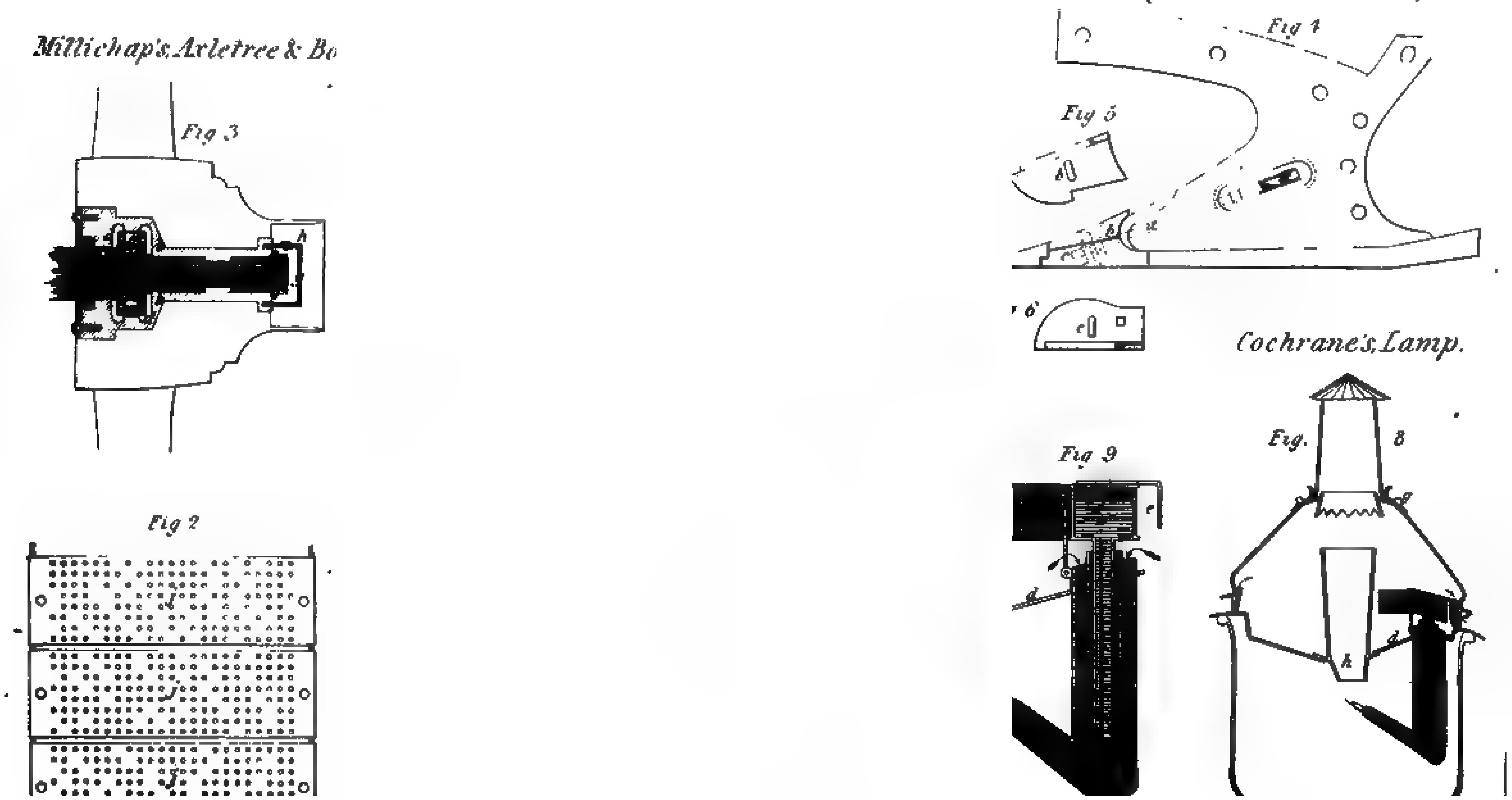
Plate V



Pearsons
Rudder
Fig. 1
Jamiesons Marine Thermometer Case
Fig. 2.
Fig. 2. *
Fig 3
Fig 4.
Fig. 5
Bullocks Ball Valve
Fig 5 *
Fig. 6.

Lambert's Weaving Machinery. Ransom's Plough. PLATE

Millichap's Axletree & Bo



working the apparatus by hands upon deck, and the lower part of the solid rudder is cased with metal, in order to facilitate the sliding of the hollow part, to which are attached anti-friction rollers. At *d*, and *e*, are sheaves or pullies, conducting a rope to the deck, for the purpose of raising the sliding part of the rudder upon any occasion; as also another rope from the top of the conductors, *c*, for the purpose of lowering the same when it may be found necessary. At the lower end, and back of the sliding part of the rudder, is a gudgeon which works up and down upon a pintle *f*, as a guide to the sliding part of the rudder; and, in the bottom of the slider, are scupper-holes, to clean it of mud.

Inrolled, January, 1821.

To FRANCIS LAMBERT, *of Coventry Street, in the Parish of St. James, Westminster, for an Invention communicated to him by a Foreigner, residing abroad, being a new method of Mounting and Producing, and also of Removing, Preserving, and Replacing the Figure in Weaving Gold-lace, Silver-lace, Silk-lace, Worsted-lace, Cotton-lace, Thread-lace, and other Laces, whether made or composed of the aforesaid Articles, any or either of them, or a mixture thereof.*

THE subject of this Patent is an apparatus to be connected to the ordinary loom, for the purpose of weaving lace or damask patterns in any of the above fabrics, upon a more extended scale, and with greater facility than by the modes and machinery hitherto employed for that purpose. The Patentee states that he uses a loom of the usual construction; with the exception of the parts

called high or upper leases, tyers, or other contrivances hitherto adopted for mounting and producing the figure upon silks, &c.; instead of which leases, tyers, &c. he places upon the top of the loom his improved apparatus for producing the figure, which is constructed in the following manner:—

The warp being extended as usual in the loom, strings are carried up to lifting-hooks and rods, connected to lifting-bars, for the purpose of raising the warp in the parts required for the formation of figures nearly as in the ordinary process of figure weaving. These lifting rods are bent double some distance up from their lower extremities, for the purpose of forming parallels to receive guide-bars, and are each of them, at the upper-end, turned over as a hook, which is intended to catch upon a pin in the lifting-bar. The lifting-bars are raised as usual by means of treadles; and as the strings which pass through the warp are connected to the lifting rods, the warp threads are removed by the lifting-bar whenever the treadle rises. But as the weaving of figures, or damask, arises from the occasional removal of certain parts only of the warp, it follows that the lifting rods are not all to rise together, but that certain rods are to remain stationary while the remainder are raised; by which means certain parts only of the warp are removed during the throw of the shuttle, which produces a shade or different disposition of the threads in that particular part of the fabric then operated upon.

A diagram of the position of those parts of the machinery, which produce the effect just described, is shewn in Plate VI. fig. 1. But as the construction of the complete apparatus, as connected with a loom, is in its nature extremely complicated and minute, it is not necessary to exhibit more than such parts of the mechanism as will

explain the effect of a single operation. In this figure, *a a*, are strings which pass through the warp, (but not shewn), for the purpose of lifting it; *b b*, are lifting rods, to the lower extremities of which the said strings are fastened; these rods (as before-mentioned) are bent up, forming parallels for the guides *c c*, to slide in. The top of the rods are turned over, forming hooks, which catch upon the pins in the lifting bars, *d d*, which lifting bars are raised alternately by the levers, *e e*, connected to treadles at the hinder part of the loom; *f f f*, are needles with eyes, each guiding one of the lifting rods, which rod passes through the eye of a needle.

It will here be seen that if any of these needles are pushed back (as *f* 1, *f* 1,) the lifting rods which they guide (as *b* 2, *b* 2,) will be removed out of the perpendicular, and, consequently when the lifting bar *d* 1, rises, the hooks of the rods, *b* 2, *b* 2, will not catch upon these pins of the lifting bars, and therefore do not go up with the other rods; and hence the parts of the warp, to which these rods, *b* 2, *b* 2, are connected, remain stationary, and by changing the disposition of the threads in the warp, produce the varied or shaded appearance of damask.

The mode of producing a succession of changes in the needles, so as to shift certain lifting rods and thereby vary the warp threads, is the next subject to be explained.—*g*, is a square box, which turns vertically upon an axis, or pivots, and swings in two arms, *h*. When the lifting bar *d* 1, descends, the roller *i*, connected to it, (working in a curved guide,) brings the flat side of the box, *g*, flush against the ends of the needles, which would force them all back, but that the face of the box is pierced with as many holes as there are needles; the ends of which pass into the said holes. The mode then by which any one needle or several certain needles are

forced back, is by the intervention of a paste-board exactly fitted to the face of the box; which paste-board is pierced with the said corresponding holes, *excepting* at the parts opposite to the ends of the respective needles which are to be acted upon. Now, on the box being brought up flush, as above described, the ends of the needles will pass through the perforations in the paste-boards, excepting at those parts which are not pierced. When the paste-board (at the parts which are not pierced) strikes against the ends of the respective needles, they will be forced in, and the respective lifting rods connected with these needles will be pushed off the pins in the lifting bar as it again rises, leaving the warp threads, to which these respective rods are attached, stationary.

The continued change required as to the particular lifting rods which are to remain stationary, and those which are to rise with the lifting bar in the progress of weaving the figure, is effected by bringing a number of paste-boards, differently pierced as above, in succession against the ends of the needles. These paste-boards (with blanks left opposite to such needles as are designed to be pushed in) are all mounted upon tapes, and in the manner of an endless chain passed over rollers, the paste-boards falling singly upon the flat side of the box, *g*, which revolves as mentioned above. When the lifting bar, *d* 1, falls, it brings the paste-board, which is then on the face of the box against the needle ends; and when it rises pushes back the box, which, is turned one quarter round by means of a catch into a ratchet, or some such contrivance; this brings the next paste-board in succession upon the face of the box, which in striking against the needle ends on the next descent of the lifting bar, shifts certain other lifting rods from off the hooks, and so continues to vary the disposition of the warp-thread

at every stroke of the shuttle. Fig. 2 is intended to shew the faces of three of the pasteboards attached to the tapes, which are seen to be regularly pierced with holes, through which the needles that are not to be disturbed are to pass; those parts where holes would come if the pasteboard were pierced all over, are seen as blanks, for the purpose of striking against the needles.

Thus it must be evident, that such a number of pasteboards are to be provided and mounted as equal the number of throws of the shuttle between the beginning and end of any figure or design which is to be woven; the piercing of each pasteboard individually, will depend upon the arrangement of the lifting rods and their connection with the warp, which is according to the design and option of the workman; great care must be taken that the holes come exactly opposite to the ends of the needles; for this purpose two large holes are made at the ends of the pasteboards, which fall upon conical points, *k, k, k, k*, by which means they are made to register correctly.

It will be hence seen, that, according to the length of the figure, so must be the number of pasteboards, which may be readily displaced so as to remount and produce the figure in a few minutes, or remove it, or replace it, or preserve the figure for future use. The machine, of course, will be understood to consist of many sets of the lifting rods and needles shewn in the diagram, as will be perceived by observing the disposition of the holes in the pasteboard, fig. 2: those holes, in order that they may be accurately disposed, are to be pierced from a guage, so that not the slightest variation shall take place. These are the principles and general action of this most ingenious contrivance, which we have no doubt will prevail, to the great benefit and improvement of this branch of the weaving business.

Inrolled, August, 1820.

To James Ransome, *of Ipswich, Suffolk, and* Robert Ransome, *of Colchester, Essex, for an Improvement upon an Invention for which the said* James Ransome *obtained a Patent, dated 1st of June, 1816, entitled an " Invention for certain Improvements on Ploughs."*

The invention here alluded to as the subject of the former patent was a new construction of a plough-share, and its mode of attachment. In the present improvement the plough-share remains the same as before described, but the upper and lower chaps which hold and confine the share in its proper place are here differently constructed and affixed, by which the parts are less liable to be out of order, and are removed and replaced with greater ease and facility to the ploughman. Plate VI. fig. 4, is a view of the land side of the frame or body of the plough, with its improved chaps and share complete.— Fig. 5, represents the upper chap detached, and fig. 6, the lower chap, with the loops by which they are fastened to the plough-head. Fig. 7, the share; *a*, is a wedge-bolt (seen through an aperture) sliding in a socket or keeping-plate on the reverse side of the plough-frame, upon this bolt there is a joggle, or nob, which passes through the aperture or slit above-mentioned, and by striking which joggle or nob with a hammer, the bolt is passed down through the loops *b* and *c*, of the two chaps, as shewn by dots, which chaps will then clip the plough-share and hold it firmly on the nose of the plough. The lower chap *c*, may, instead of being a distinct and separate piece, form part of the ground-frame, bottom-piece, or slade, but must have the loop as shewn, for the purpose of receiving the wedge-bolt. The upper chap, *b*, may also, instead of being a separate piece, as shewn, form

part of the breast-plate, or mould-board of the plough, or be a part or continuation of the ground-head or frame, as most convenient. It is only necessary farther to observe, that when either of the chaps are so constructed as to form a part of the main frame, head, or slade of the plough, the loop *b* or *c*, need only be made to that chap which is moveable.

Inrolled, January, 1821.

To GEORGE LILLEY, *of Brigg, Lincolnshire, and* JAMES BRISTOW FRASER, *of Blackburn House, Linlithgow, for certain Improvements in the Application of Machinery to propelling Boats and other Vessels floating in or upon Water, and for attaining other useful purposes, by means of a Hydro-pneumatic Apparatus, acted upon by a Steam Engine, or other adequate power.*

THE intention of the patentees in this invention is to propel boats or other floating vessels by means of the force exerted by a jet of water, striking beneath the surface, against the body of water on which the vessel floats. Their principles of action are capable of various modifications, but the mode exhibited in Plate V. fig. 8 and 9, is the most simple, and will best explain the inten tion. Fig. 8, is the plan of a vessel, with the apparatus, which may be upon deck or below, as circumstances render most convenient. Fig. 9, is an elevation of the same, taken lengthwise; *a a*, is a breech pipe placed near the head, for the admission of water into the main, *b*, and thence to the jet pipes, *c c*. Over the junction of the main and jet pipes is an air vessel, *d*;

within the main are two reciprocating pistons, *e* and *f*, shewn by dots only. In order to work these pistons a steam engine is employed, though not shewn in the plate; the action of the whole is as follows:— The moving power being connected to the axle, *g g*, the cranks are put in motion with the balance or fly wheel; which cranks cause the pistons, *e* and *f*, to approach and recede from each other, to and from the centre of the main. The rod of the piston, *e*, passes through the hollow rod of the piston, *f*, the valves of which pistons both open inward, or towards the stern, in order to admit and force the water that way. The reciprocating motion of the pistons is effected by means of the double crank, and the parallel action of the double lever, *h*, connected to the rods, *i* and *j*. As the fly-wheels and cranks revolve, the two pistons will first recede from each other towards the extremities of the main, and the valve of *e*, opening as the piston slides outward, a current of water passes through it into that space of the main which is between the two pistons. But on the two pistons again approaching each other, the valve of *e* will be closed, and the water behind it passes through the valve of *f*. When the pistons again recede the valve of *f* will be closed, and the water behind it be forced into the jet pipes, *c c*, where, meeting with the resistance of the back water which occupies the jet pipes, it will then ascend into the air vessel, *d*. The rapid returning strokes of the two pistons will thus force a quantity of water into the air vessel, which being continually acted upon by the elasticity of the compressed air within the vessel, a jet of water is, with considerable force, ejected through the jet pipes, *c c*, which striking directly against the body of water in which the

vessel floats, impels the boat in a direction opposite to that of the jet.

Such is the principle upon which this patent is founded subject, as before observed, to various modifications; in one of which it is proposed to place lateral pipes, leading from the main fore and aft of the vessel; so that by opening a jet near the head, and an opposite jet near the stern, the vessel might be tacked about without making way. These ideas are not new; and if they were, it is most certain that the mode which generally prevails of attaching paddle wheels to a first mover, for the purpose of propelling vessels through the water, is much more simple and efficacious than the mode here proposed.

Inrolled, October, 1820.

To the Hon. William Erskine Cochrane, *of Somerset Street, Portman Square, London, for an Improvement in the Construction of Lamps.*

The improvement proposed in the construction of this lamp consists in a peculiar disposition of the parts of (we believe street) lamps, whereby the flame is made to bend in an inclined or oblique direction, instead of rising perpendicularly from the wick; by which means the shadow of the lamp is not thrown downward as usual, but the radiance of the flame is immediately beneath the lamp as well as around it. By the peculiar construction of the lamp, as will be shewn, a current of air is directed against the flame so as to carry it out of its naturally erect tendency, and to cause its projection over the edge of the burner. In Plate VI. fig. 8, is a representation of a lamp on the improved construction, surrounded by such a glass case or vessel as is usually

applied to ordinary street lamps. This glass is closed by a common but closely fitting lamp top, having within it a reflector formed as an obtuse cone, the apex downwards, with a cylindrical chimney in the middle immediately over the flame, for the smoke and vapour to ascend. An opening is made in the reflector through which the improved lamp is to be introduced, and corresponding pieces of plate are attached to the lamp, which fit into and fill up the opening in the reflector, when the lamp is hung in its place.

The construction of the various parts of the lamp will be best understood by a section of it shewn at fig. 9:—*a* is the oil reservoir and its pipe, which is filled on being drawn out of the tube (in which it is here seen inserted) and turned upside down. It will be observed that there are two passages in the pipe leading to the reservoir: the lesser one is merely a passage by which the air may escape from the reservoir while it is filling with oil. Being filled it is turned downwards into the tube, as shewn, and secured by a clasp or buckle, *b*, when the oil flows to the burner.—*c c*, is an air channel formed by an outer tube of larger diameter than the oil tube, and surrounding it. This tube is open at the top, above the reflector, and receives its supply of air by the vent holes in the lamp top. The action is as follows:—The air entering into the lamp top through the vent holes, proceeds down the tube last described, and up the elbow part of it towards the flame; which flame, by the pressure of the air through this channel, is driven out of the perpendicular into an oblique direction, for the purpose of spreading its light as above-mentioned; besides which a greater supply of air will be thus afforded to the flame, and its brilliancy increased. The manner in which the lamp is suspended or attached to the reflector, is by

means of two thin pieces of metal connected to the lamp *d* and *e*, one of which rests upon the reflector, as above described, and the other hooks into the rim of the lamp. The flame for igniting the lamp is introduced to the burner through the chimney, by turning over the upper part or neck of the lamp-top upon its hinge, *g*. Some slight alteration or modification of form in the fountain oil reservoir, differing from that shewn in the figure is proposed, but which does not interfere with the principle of the air passage, and merely respects the mode of filling. Flat wicks or burners are proposed to be used, which may be held between a piece of tin or other metal doubled and slipped into the channel, as seen in the figure. The edge of the chimney may be sloped off, as shewn in the fig. at *h*, for the purpose of more immediately directing the current of heated air, smoke, and vapour up the chimney.

The patentee in his specification having described the invention as above, proceeds to say, "I do hereby declare that my said improvement consists in and is confined to that disposition of the parts of lamps used for illumination, whereby a regular current of air is projected in such direction upon the flame as to carry the same out of its natural, perpendicular direction, into an inclined or oblique direction, in order to give light immediately beneath the lamp."

Inrolled, December, 1820.

To JOSEPH WOOLLAMS, *of Wells, Somersetshire, for Certain Improvements in the Teeth or Cogs formed on, or applied to, Wheels, Pinions, or other Mechanical Agents for communicating or returning Motion.*

THE improvements which seem to be aimed at by this patentee, are, as far as we can understand them,

from the specification, entirely theoretical. Much is said about the *pitch-line* of the teeth, of the line of centres; of the proper mode of generating a tooth upon a plane and winding it round a cylinder or a cone, in various directions; of forming teeth or cogs, inclining obliquely to their respective planes of motion; of their natural curvatures when placed upon a cylinder or cone; of the points of contact, when the teeth or cogs are taking into one another; and of placing teeth upon the periphery of wheels in a diagonal direction, or in angular positions meeting in points, so as to roll one into the other without friction, instead of acting as levers.

Without describing the particular shape of which the teeth are to be made, the patentee says; "In forming my improved teeth, in order for them to produce what I deem their most perfect action, let them be so made that those parts of each, which are exterior to the pitch line of its wheel or other mechanical agent, shall be so much smaller than the cavity within the pitch line of the wheel, or other such agent into which it is to move, as will enable it to enter and pass out therefrom without preventing the pitch line of the teeth of either such mechanical agent from rolling on the pitch line of the teeth of the other, with such uniformity of motion, that every part of each tooth situate in those pitch lines may successively meet in the line of centres. To accomplish this, in the case of any of the mechanical agents intended to be furnished with teeth, I cause the planes intended for their pitch line to roll on each other, and ascertain that curve which the part intended for the summit of one tooth, will generate within the pitch line of the other wheel, or other mechanical agent. Then the cavities to be made between adjoining teeth of the agent, and within its pitch line, should be (in planes parallel to that in

which the curve has been generated,) a portion of a larger curvilinear figure, than the curve so generated. Next, if the pitch lines are to be situated between the bases and summits, cause the aforesaid planes, intended for the pitch lines, to roll on each other, and ascertain that curve which the part intended for the summit of that tooth, (the cavity between which, and its next tooth, having been before ascertained,) will generate within the pitch line of the agent to which it has been applied: the curvature of whose space within the pitch line has been before formed. Now such teeth or cogs, so *inclined*, and so *arranged*, being, to the best of my belief, entirely new, except the endless screws with their compounds, I am desirous to maintain this my exclusive right, &c. as applied to all mechanical agents for communicating or returning motion, not hereinbefore excepted, &c. &c."

Inrolled, January, 1821.

To Major Peter Hawker, *of Long Parish House, near Andover, Hants, for a Machine, Instrument, or Apparatus, to assist in the Attainment of proper Performance on the Piano Forte, or other keyed Instruments.*

The machine or apparatus which constitutes this invention consists of a supporting-rod placed horizontally in front of the keys of the piano forte, upon which the hands of the performer are to be supported, and to slide backward and forward. This rod, formed of wood or metal, may be round or oval, and is mounted upon pins or supports, which are screwed on to the front of the

bottom-board of the instrument by vices, the whole of which is capable of adjustment as to height and distance from the keys, its length being about the same as the front of the piano forte, and need only be sufficiently strong merely to support the hands without bending. It must be particularly smooth upon its upper surface, so that the free motion of the hands in sliding along it may not be impeded. The second part of the invention consists of moulds for the hands to rest in, for the purpose of guiding the fingers. These moulds (which if the inventor would allow us, we should call *clogs*) are made of wood, leather, or *papier machée*, carved or moulded to the form of the under part of the right and left hand, from the wrist to the extent of the knuckles. They are to be smooth on their under side, for the purpose of sliding upon the rod or rest before-mentioned, and are fastened to the hands by means of straps, which pass over the back of the hand round the wrists, and buckle on. It is to be observed, that these hand-moulds are to be more carefully modelled to fit the hands of the performer, than even a shoe would be made to fit the foot; as the shape of the interior of the mould must correspond exactly to the shape of the fleshy part of the inside of the hand. There are also proposed to be different moulds for the same hands, in order to facilitate the performance of open or of close passages in the music; such as chords and octaves, in which the fingers require to be extended, or in such as the notes follow close after each other in succession; and it is of course obvious, that a variety of hand-moulds must be necessarily prepared, in order to suit the hands of different performers. The right and left hand mould must not be parallel, but must incline so as to converge towards each other at the ends, where the figures are placed in such a manner as to throw the hands, wrists, and arms into a

natural, easy, graceful, and effective position for performance. The close or narrow moulds are proposed for the use of those pupils who are beginning to learn the art of fingering, while the open or wide moulds are to be afterwards resorted to when the performer becomes more proficient. "The great and important use (the patentee observes) of the hand-moulds is not, however, so much to influence the position of the fingers, as that of the wrist generally: for since a great desideratum in the operation of fingering a keyed instrument gracefully and perfectly, is to maintain a level or horizontal position with the hands, and to prevent the wrists from falling or sinking; so the hand-mould itself, with the assistance of the supporting-rod, effects the first of these objects, while the continuation of the mould under the wrist of the performer produces the second. With a view, however, to the more perfect accomplishment of this last object, I not only form the hand-moulds in the forms or shapes herein-before described, but I occasionally leave or introduce a swell in the mould immediately upon that part on which the wrist would rest, for the purpose of bearing it up." It should have been observed, that the under or flat side of each hand-mould has a flat piece of hard wood having a very smooth groove or channel formed in it, corresponding to the shape of the upper side of the supporting-rod. By means of this groove, the hand-mould may be made to slide freely, but truly, from one end to the other of the supporting-rod. In adjusting the height of the supporting-rod, which is to be screwed on the bottom-board in front of the keys, as before-mentioned, its height must be such, that when the hand is applied (the mould resting perfectly level) the thumb may just lie upon, or come in

contact with, the lower or natural keys of the instrument.

The application of *clogs* upon the hands for the purpose of facilitating the acquirement of a graceful performance upon the piano forte, or any other keyed instrument, may be, as far as our own experience goes, perfectly new, and upon its merits and advantages we shall presume to make no comment: we have seen dancing in clogs and also in fetters, but it never struck us that these appendages in any respect facilitated the agility or improved the graceful motion of the performer.

Inrolled, December, 1820.

To John Heard, *of Birmingham, in the County of Warwick, for an Invention of certain Improvements in Cooking Apparatus.*

This invention consists in the construction of a stove or fire-place for the purposes of baking, boiling, roasting and other culinary purposes, as well as for heating the room in which it may be placed, with a very small consumption of fuel; which stove is equally adapted for ships, or dwelling-houses. The stove is intended to be insulated, that is to stand in the middle of the room, or elsewhere without brick-work. Its external form is proposed to be that of a cube, or it may be octangular. The frame or case of the stove is constructed of cast iron, sheet iron, or other plates of metal, screwed or rivetted together, and standing upon feet, for the purpose of raising it a few inches from the floor, and allowing air to pass under it.

The interior of the stove is to be composed of parts which may be readily taken out for the convenience of portability. The bottom of the stove is formed of a thin plate of cast iron, with ribs to strengthen it. This plate is made to fit exactly to the interior of the case, and is lowered down to the bottom by the means of handles, when it rests upon ledges, made in the case for that purpose. Moist clay is now to be used for filling up the joints and cementing the bottom to the frame or case, in order to prevent the sand, loam, or other incombustible matter from running through, which is to be spread in a thick bed over this bottom plate, for the purpose of intercepting the heat of the fire from communicating to the flooring. After making the sand, &c. level, the oven is next lowered down upon it, having its sides and partitions standing erect from the bottom plate, and at angles, so as to leave a space between the oven and the case or frame to be filled up with sand, loam, or other incombustible substance; the oven being luted at the joints with clay, for the reasons above stated.

In the framing of the oven, a space is left to admit the fire place, which is now introduced, with its bars, and a false back and cheeks, which do not touch the oven within about half an inch, in order to prevent the heat from being too suddenly transmitted. The top of the oven is next introduced into the frame or case, which is a plate similarly shaped as before, so as to fit exactly the interior. This plate is flat on its under surface, and rests, when fixed, upon the top edges of the partitions or sides of the oven. Upon its upper surface are rebates to receive the partitions of the next or top plate. The top plate of the flues is now put on, which is intersected on its under side by several angular or winding partitions which fit

down into the rebates of the last plate, and form circuitous flues, in order that the heated smoke may pass from the fire-place over as great a surface of the oven top as possible, before it ultimately discharges itself into the chimney. In the top plate of the ovens, there are two dampers (with handles in front) which lift up, and, by rising, close the passages of the flues; or one of them being raised, will direct the course of the smoke through a different flue.

Above, or upon the top plate, the stewing vessels and boilers are placed, or if not in use, the apertures provided for them in the frame or case may be closed by covers provided for that purpose, which converts it into a heating stove. There are doors in the sides of the frame or case, for the purpose of gaining access to the ovens; and there is also a damper, or blower, which slides up and down in front of the fire-place, to increase the draft when lighting the fire, and an additional shutter fixed over the front of the fire, to confine it when used on shipboard in stormy weather.

The patentee does not confine himself to the precise form of the apparatus, or to the particular form of any of its parts as described; because, under some circumstances it may be desirable to vary the shape and disposition of the whole; but considers the essential part of his invention to consist in the construction of a simple apparatus for cooking, which (though necessarily heavy) will be nevertheless portable from the facility of dismembering the whole, and removing it in pieces, which can be again replaced or fitted together, without the aid of tools or the necessity of brickwork.

Inrolled, May, 1820.

Original Communications.

To the Editor of the London Journal of Arts and Sciences.

SIR,

WILL you allow me to make a few observations on the short article in your last Number, in which you announce the unanimous resolution of the Society of Arts, "to present me with their gold medal, a complete copy of their Transactions from the commencement, and their electing me a perpetual Member of the Society," an honour which I cannot but feel highly gratifying, and which I flatter myself I duly esteem.

The observations to which I wish to call your attention, relate principally to the concluding sentence, where you say, "It is however remarkable that Mr. Lecount (see a paper in the present number) should have made similar discoveries to Mr. Barlow."

The word *however* here, seems to me, to render this sentence a little conspicuous, and to imply, *I think*, some doubt on the originality of either Mr. Lecount's conclusions, or on mine, or perhaps on both; particularly as I know it has been said, that there is nothing novel in my deductions: on these points, therefore, I beg to be permitted to make a few remarks, in the course of which, I will endeavour to point out those results, in which Mr. Lecount and I coincide, and those which are at present peculiar to my own Essay.

I shall not, in this article, attempt to explain either the apparatus, or the nature of the investigations which I employed, in order to arrive at my conclusions, these being given in detail in my work, but shall confine

myself strictly to results, which may be enumerated as follows:—

1. I proved by my experiments, that there is in every ball of plain unmagnetized iron, a circle or plane of no attraction; viz. a plane in which if a compass be posited, the iron will have no influence in disturbing the natural direction of the needle. This plane descends from the magnetic north, passes through the centre point of the ball, and inclines to the plane of the meridian in Woolwich, at an angle of about 19° 30′.

In order to render this fundamental fact the more intelligible, let S Q N Q represent a ball of iron, the circle Q S Q being in the plane of the meridian; let Q H Q H, be arcs of 19½° each, then the circle Q E Q W will represent the circle or plane of no attraction, which has this property, viz.—if from the centre O, any lines as O C^{i} O C^{ii} O C^{iii} be drawn in this plane, compasses placed any where in these lines will observe the same natural direction as they would do were no iron found in their vicinity.

2. My next object was to determine the quantity of deviation caused by the iron ball when the compass was removed any where out of this plane, as at C^{iv} C^{v}, &c. and the law which I obtained was this, that the tangent of the angle of deviation is always proportional to the rectangle or product of twice the sine of the arc M L, and the cosine of the arc E M E, being the east point of the horizon, L the point where the line O C^{iv} cuts the sphere, and M the intersection of the arc S L M, with the plane Q Q, of which S is the pole.

3. The preceding determination having given the deviation for any point of position, while the distance from the centre remained constant, I was next desirous of determining the law of attraction for different distances, while the angular position was the same: and the result was, that the tangent of the deviation is inversely proportional to the cube of the distance from the centre, so that, at a double distance, the tangent of deviation is only one-eighth of what it is at the single distance.

4. It now remained for me to determine the law of deviation when different masses were employed, the distance and position being the same; and I succeeded in proving that the tangents of the deviation in this case are proportional to the cubes of the diameters of the balls.—So that a ball of any given diameter will only produce one-eighth of the deviation of a ball of double that diameter.

5. Hence again it follows, that while the angular positions are the same, and the distances proportional to the diameters, the deviations will be the same also.

6. All the above laws were sought after and obtained by a long course of experiments; but I now obtained a result, by no means less interesting, although wholly unlooked for; which was, that the power of attraction in

reason, that similar experiments had been made in Denmark many years ago.

This is stated in a letter from the late Sir J. Banks, to the late General Mudge, of which the following is a copy.

Soho Square, May 13th, —19.

" My dear Sir,

" I have received Mr. Barlow's paper, and have placed it in the hands of the Secretary of the Royal Society, to be read at the first meeting. It gives me much satisfaction to see that experiments have been made by Mr. Barlow on the subject.—I find, however, that some experiments somewhat similar have been tried in Denmark many years ago. The results I have not yet obtained, being ignorant of the Danish language, in which they are recorded, but I hope to obtain a translation in a few days.

" Most faithfully your's,

(Signed) " JOS. BANKS."

This is all the communication either General Mudge or myself ever received from the Royal Society on the subject; and I assume it therefore to contain the ground of the rejection.* At length, after waiting several months for the result of the promised translation, and General Mudge's lamented death having occurred in the interval, I wrote to Professor Schumaeher, the learned Danish astronomer, informing him of the contents of the above letter, and requesting that he would inform me respecting the experiments in question, the author of them, and the work in which they were contained; in order that I

* I ought, perhaps, to except a letter I received from Mr. Brande, in answer to one from me, which informed me my paper had been read.

might give the particulars in any future edition of my work, stating, however, that I thought it very improbable if such laws had ever before been obtained, that they should have been lost sight of.

Mr. Schumaeher, unwilling to trust to his own recollections on this subject, consulted his friend Commodore Wlengel, who has much interested himself on the subject of magnetism, and the following are the letters I received from these gentlemen. That from Commodore Wlengel having been written in the Danish language, I was favoured with the following translation of it by Captain Tuxen, an ingenious Danish officer at present resident in this country. The letter from Mr. Schumaeher is written in English."

From Commodore Wlengel, to Professor Schumaeher.

TRANSLATION.

"Though there have been made experiments in Denmark, not only on the effects of considerable masses of iron on the needle, but also on the mutual influence of magnats. Yet experiments similar to those published in the Edinburgh Philosophical Journal,* No. 2, October, 1819, page 344, et seq. and several of the results deduced from them, never have been publicly known before in this country, which I herewith testify.

(Signed) "P. W. WLENGEL,
"Commander in the Royal Danish Navy,
Examinator at the Royal Naval Academy,
Director of Navigation, Knight of the
Order of Dannebrogen".

"Copenhagen, June 16, 1820."

* It should be observed, that in consequence of the last illness of Gen. Mudge which terminated so fatally, a copy of my work which was intended to have been forwarded to Copenhagen had not been sent.

From Professor Schumaeher to Mr. Barlow.

"DEAR SIR,

"I have just received the Edinburgh Philosophical Journal, and found an account of your experiments. However, I was aware that such experiments never had been made here. I requested my worthy friend the Commandeur Wlengel, who has applied himself with great success, particularly to these studies, to give his opinion of it, if they were new or already made here. You will find that your experiments never were made in Denmark."

"Your very obedient servant,

(Signed) "SCHUMAEHER."

These testimonials are, I trust, sufficient to prove that no results of the kind above stated were established in Denmark. I have also strong reason to believe that they were not known in Paris; for I have explained my experiments to M. M. Gerard and Dupin, Members of the Institute of France, and to M. Hachette, who may be said to be in the focus of Parisian science; I have also lately had the honour of exhibiting them to his Excellency the French Ambassador, accompanied by M. Brunel, and other scientific Frenchmen, amongst whom was (I believe) M. De Mirebel, also a Member of the Institute; and in no instance have I heard the slightest hint that any of those results were previously known in France. That they were not known to the Members of the Royal Society is evident by Sir Joseph Banks's letter, referring them to Denmark; and that neither the secretary nor any of the Members of the Board of Longitude were acquainted with them is strikingly illustrated by the paper which

was published by authority of the board just before my communication was made, entitled "Rules and Tables for clearing the compass of the regular effect of a ship's attraction." In which the author assumes, as every person had hitherto done, that the points of *greatest* attraction are at east and west, not only in high latitudes, north and south, but in all parts of the world; whereas it is clear from the laws laid down above, and from the experiments of Mr. Lecount, that these are actually, in places near the equator, the points of *least* attraction. I do not mention this circumstance in order to expose the errors of the above table, although I think they should be known, but merely to prove that the laws which I have stated were not known in this country prior to my promulgation of them, any more than they were in France or Denmark.

That they were remote from the surface of the science, or that it required extraordinary talents to develope them, is by no means what I wish to contend for; nor is this, I conceive, at all requisite to give importance to a scientific discovery. The great law which connects together the entire solar system had been very nearly established by Hook; and even the doctrine of fluxions was bursting into life in the methods of Fermet and Barrow, when our illustrious Newton, in both cases, and, apparently, by the slightest effort, appropriated the glory of both discoveries to himself: one step only was wanting, and that step was made by Newton—although *his* extraordinary genius was not necessary in either case: both discoveries must have been made had Newton never lived.

After all, I do not assert that the expression to which I have alluded was *intended* by you to convey the construction I have put upon it, but it *would* bear that construction, and I avail myself of the circumstance, as offering a

favourable opportunity of stating the above particulars, and by allowing them a place in your Journal,

You will much oblige

Your obedient servant,

PETER BARLOW.

Royal Military Academy,
Woolwich, Feb. 12th, 1821.

P.S. There is another point connected with your report which I wish to correct. I am not aware that the paper I have sent to the *Society of Arts* is "more explicit" than what is contained in my Essay; the difference is, that I have there explained the method of applying my plate to the azimuth, instead of attaching it to the binnacle, compass. The change is apparently trifling, but the advantage of the former over the latter is, notwithstanding, very considerable.

To the Editor of the London Journal of Arts and Sciences.

Leeds, Feb. 15th, 1821.

SIR,

BEING an admirer of the plan adopted in your Journal, of giving to the public an early account of new inventions, and as the burning of smoke at present engages the attention of many, I request you to insert in your next, if consistent with convenience, a new invention for that purpose. The contrivance will be best understood by inspecting the drawing which accompanies this. (See plate IV.) The most effectual method yet known for consuming smoke, is by the admission of a large quantity of air to the hottest part of the fire, at the time the smoke is bursting from the recent charging of

coal. The necessary quantity of air to be admitted ought not to be less than may pass through an aperture of four square inches for each horse power, that the boiler or fire is equal to. This will consume the smoke in from three to five minutes, according to the quantity and quality of coal put on at each time. The times of charging being not more than five times in an hour, nor less than three. The air's rushing into the flue is the moving power, for giving motion to the new regulating machine, which continues in motion during the consumption of smoke, but no longer.

By this method there is no unnecessary loss of heat, as when the aperture is left open, or the shutting it off is intrusted to the uncertainty of neglect, which is the case if regulated by hand, and from whence a great loss of fuel is the consequence.

The opening of the fire door to admit the fuel, puts the machine in a state for measuring off the quantity of air to be admitted after each charging.

In giving this a place in your useful Journal, you will much oblige, Sir,

Your's truly,

MATTHEW MURRAY.

Explanation of the Air Regulating Machine.

The same letters refer to the same parts in each of the figures, Nos. 1 and 2, plate IV.—*A*, *a*, *a*, is a sheet iron box, the end *k*, set in the brick-work, which communicates with the fire-place; *b*, *b*, a light fan wheel (shewn by dots in figure 1,) freely moving in this box, and put in motion by the air, in the direction of the arrows; *c*, a one-toothed pinion upon the axis of the fan-wheel *b*; *d*, an iron-toothed wheel, which is turned round by the

one-toothed pinion *c.*; *e*, a catch rod, worked by an excentric pin near the centre of the wheel *d*; *f, f*, a pall catch, for discharging the rod *e*, from the wheel *g*; *g*, a ratchet wheel, upon the axis of the turn valve *i*; *h*, a weight and pulley for turning the wheel *g*, and valve *i*; *k, k*, ends of the box, to conduct the air to the fire under the boiler, either of which forms may be used as circumstances require; *l*, a crank for locking the wheel *d*, during each half revolution of the one-tooth pinion *c*; *m*, a pinion on the wheel *g*, to strike against a finger on the axis of the turn valve *i*.

The action of this machine will be as follows:—

When the fire door is opened to take in fresh coal, it discharges the pall *f, f*, by means of a wire and slip catch connected to the door, but not shewn; the weight *h*, being then at liberty, turns the wheel *g*, one revolution and a quarter, which places the valve *i*, in the direction of the arrows, or horizontally; and thus leaves a free communication between the atmosphere and upper side of the fire. In this state of rest the machine remains until the fire-door is shut. The rushing in of the air to consume the smoke, turns the fan-wheel *b*, rapidly round, and, by the revolution of the pinion *c, c*, driving the cog-wheel *d*, by means of the catch rod *e*, carries round the wheel *g*, one revolution. It then brings in contact the finger and pin *m*, which gradually shuts the turn valve *i*, by bringing it in a perpendicular position. The smoke being consumed, the fire continues burning until a fresh supply of fuel is necessary: when the fire door is opened, the whole operation is repeated. By increasing or lessening the weight *h*, the time allowed to consume the smoke may be increased or diminished.

It is obvious that this principle may be applied in various ways, to obtain the purpose of a measuring regulator.

On Vegetation.

WE received a singular letter from Mr. TATUM, about two months since, which would have been noticed in our last number, but owing to an accident, of no importance to the public, we were obliged to postpone our notice to the present number.

We wish Mr. T. would confine his observations to the question of *vegetation*, and not indulge us with *his* opinion of our duty: for we exceedingly lament that the letter which he has written is so useless as a scientific paper, that we cannot think of encumbering our pages with it. If Mr. T. will favour us with any facts or arguments which he may happen, in the course of his experiments or his philosophical lucubrations to stumble upon, relative to vegetation, we shall most cheerfully lay them before the public in our pages. Of our own experiments, or other acquirements, it is not at present our intention to make a display; nor do we mean to point out Mr. T.'s literary blunders in the letter before us; but, as our authority on vegetation is, in this gentleman's estimation, very low, we will tell him what Mr. BRANDE says upon the subject, and if it does not warrant us in our conclusion, we have done. *See our observations on this subject, Vol. I, Page 436.*

"As the plant advances to perfection, it becomes dependent upon the air and soil for its nutriment: the roots absorb moisture and other materials; and the leaves while they exhale moisture, frequently absorb carbon from the carbonic acid present in the atmosphere, and evolve oxygen. This evolution of oxygen takes place while plants are exposed to the solar rays, and appears one of the most efficient causes hitherto suggested for the purification and renovation of the air. In the night time the

leaves of plants always exhale carbonic acid, and at all times if the leaves be dying or unhealthy. There are also certain plants which appear, at all times, rather to deteriorate than renovate the air; on the whole, however, the balance is in favour of amelioration, (Davy's Agricultural Chemistry, 4to, p. 195,) though the disappearance of the enormous quantities of carbonic acid gas continually pouring into our atmosphere, can, I think, scarcely be referred to the purifying action of vegetables alone."

BRANDE's Manual of Chemistry, p. 345.

Novel Inventions.

On the Application of Steam to the Preparation of Human Food.

STEAM has not yet been applied to all the uses of which it is susceptible; it has been nevertheless already so much employed in domestic economy, as to leave no doubt of its being one of the most powerful and economical agents with which we are acquainted.

Having had an opportunity of personally inspecting the kitchen of the *Royal Naval Asylum at Greenwich*, we are enabled to state the very superior method in which cooking by steam is conducted in that establishment, and which provides food for about one thousand children.

One cooking boiler, containing 250 gallons, another 150, and an apparatus for dressing potatoes, are all worked by steam. The largest boiler may be made to boil in twenty minutes from the period of the first application of the steam. Pease soup and milk, are by this apparatus, prepared of very superior quality, as neither

of them can possibly be burnt: a consideration in the cooking of these articles, in the large way, of no trifling importance.

The apparatus for cooking potatoes is fixed about seventy feet from the steam boiler. The steam is conveyed by pipes, crossing the kitchen overhead from the scullery, where the steam boiler is fixed; a branch to each of the pipes to each boiler is also laid on from the main. The potatoes are put into copper colanders, which are perforated with holes in every direction except the top; these colanders fit into a copper case, which is so constructed, that the condensed water from the potatoes is immediately conveyed away. The number of these colanders at the Royal Naval Asylum is seven; they contain about one bushel and a half of potatoes each. The whole of this large quantity of potatoes in the seven colanders is effectually boiled by this steam apparatus in the short space of *twenty minutes.*

This apparatus, as well as numerous others in and around the metropolis, was erected by Mr. JOHN PONTIFEX, of No. 55, Shoe Lane, London, whose ingenuity in such work is unquestionable.

Mr. BULLOCK, of Star Court, Compton Street, Soho, London, has invented a very simple, and, we conceive, useful apparatus, to be attached to the service pipe of a cistern, or water tank; for which the Society of Arts, have presented him with a gratuity of five guineas, upon condition of his giving the invention to the unrestrained use of the public—See Vol. XXXVIII, p. 57 of their Transactions. It consists of a falling valve, which closes by dropping into

the mouth of the cock when the floating ball rises, instead of attaching the ball to the stop-cock as usual. The arm of the float acts as a double lever, the shorter end of which supports the falling valve, its construction being more particularly explained in Plate V. fig. 5, where *a*, is a section of the cock attached to the service pipe *b*, the falling valve, which on descending, drops into the conical recess within the cock, and stops the passage of the water. It will be perceived that when the surface of the water is low, the float *c*, hangs down, and that the short arm of the lever, (turning upon a fulcrum at *d*,) lifts the valve, and opens the water passage; but when the surface of the water rises, as when the cistern or tank is full, the float rises also; the short arm of the lever then descends and suffers the falling valve to drop into the conical recess, closing it as above mentioned. By the substitution of this simple valve, instead of the ordinary stop-cock, the waste of water and accidents arising from stiffness and inaction are entirely prevented, and a free passage for the water allowed until the vessel is nearly filled; besides which, this apparatus will act under circumstances, as in a very shallow cistern, where other modes would be found ineffectual.

Mr. Jamieson, of Glasgow, has constructed a Thermometer Case, for the purpose of assisting in ascertaining the various temperatures of the sea at different depths. The object of this instrument is to retain a portion of the water taken up from any given depth, and to keep it surrounding the mercury, until the thermometer is drawn up and its height read off by the person on deck. By this instrument the thermometer is not only protected from accident, but the temperature at different depths of the

sea may be ascertained, the height of the mercury not being subject to change as the thermometer passes through the varied temperatures of the water in its ascent, if inclosed within this case.

The advantages of correct thermometrical observations below the surface of the sea are important for many nautical purposes, and particularly so since the thermometer has been observed to be an indicator of the proximity of land as well as of the vicinity of the Ice Bergs, or Ice Islands, which are so extremely dangerous, particularly when attended by fog.

The instrument is a cylinder shewn in section, Plate V. fig. 2. with the thermometer enclosed, and fig. 2.* are external views of the same. It is made of sheet-copper, one-eighth of an inch thick, seventeen inches long, and open at both ends, with rising valves. The case being slung by a line, as seen in fig. 2. it must be carried towards the head of the ship and dropped, not hove. The instrument will now rapidly descend, in a perpendicular direction, and the valves rise, the water passing freely through the cylinder, until its descent is checked. When it is drawn up the valves will close, and the case remains filled with the water, surrounding the thermometer, at the temperature of the lowest point to which it descended. The quicker the line is drawn in, the more completely are the valves closed. As soon as the case comes to hand the lid is thrown open, and the thermometer drawn out sufficiently far only to read the divisions upon the scale, so as to observe the height of the mercury.

This instrument having been commended by several nautical gentlemen, particularly by Capt. Livington, of Glasgow, who has made repeated experiments of its merits, the Society of Arts, &c. have presented Mr.

Jamieson with their large Silver Medal, as a mark of their approbation (see Vol. XXXVIII of their Transactions,) and one of the instruments is placed in the Society's Repository.

Polytechnic and Scientific Intelligence.

GREAT BRITAIN.

Society of Arts.

SINCE our last, the thirty-eighth volume of the Transactions of this Society has been published. The papers in which are as follow:

On planting 1,981,065 *Forest Trees, by his Grace the* DUKE of DEVONSHIRE, *communicated* by Mr. JOHN MACHELL.

On reclaiming Waste Land, by JOSEPH RIDGWAY, Esq.

On the Culture and Preparation of Opium in Britain, by JOHN YOUNG, Esq. See page 151 of our last volume.

On the Discovery of Chromate of Iron in Shetland, by Dr. HIBBERT.

On a Glass Hydrometer for Spirits, by Mr. HENRY STOKES.

On a Marine Thermometer Case, by Mr. ROBERT JAMIESON. See our present Number.

On an improved Glaze for Porcelain, by Mr. JOHN ROSE.

The principal ingredient in this glaze is felspar of a somewhat compact texture, and a pale flesh red colour, which forms a vein in a slaty rock adjoining to the town

of Welsh Pool, in Montgomeryshire. This material, being freed from all adhering pieces of slate and quartz, is ground to a pipe-powder; and being thus prepared, 27 parts of it are mixed with 18 of borax, 4 of Lynn sand, 3 of nitre, 3 of soda, and 3 of Cornwall china clay. This mixture is to be melted to a frit, and is then to be ground to a fine powder, three parts of calcined borax being added previously to grinding.

On a Parallel Rule, by Mr. ARTHUR HARRISON.

On the Siderographic Process with a view to the Prevention of Forgery, by Messrs. PERKINS, FAIRMAN, and HEATH.

On an improved Pipe for Cisterns, by Mr. WILLIAM BULLOCK.

On the Striking Part of a Clock, by Mr. JOHN PRIOR.

On an improved Method of constructing Roofs, by A. H. HOLDSWORTH, Esq.

On the Bed-stone of a Corn Bill, by Mr. THOMAS AUSTIN.

On a Double Door-spring, by Mr. JAMES WHITE.

On an improved Umbrella Joint, by Mr. JOHN SMITH.

On a Machine for Sweeping Chimnies, by Mr. JAMES SKINNER.

On a Spring Bandage or Truss, by Mr. J. GORMAN.

On an improved Construction of Anvils, by Mr. RICHARD KING.

On Warming and Ventilating Rooms, and Ventilating the Holds of Ships, by Mr. JACOB PERKINS. See our first volume, pages 300 and 381.

On an improved Construction of the Ribs of groined Arches, by Mr. JOSEPH JOPLING.

On an improved Blowing Machine, by Messrs. JEFFERIES and HALLEY.

On improved Blocks and Springs for Wheel Carriages, by Mr. F. C. Cherry.

On Hose for Fire-Engines, by Mr. Jacob Perkins. See our last number, page 15.

On an improved Ship's Pump, by the same. See our first volume, page 299.

On Drawing off the Back-Water from Water Wheels, by the same. See our last number, page 38.

On a Spring Latch, by Mr. Alfred Ainger.

On a Mercurial Log-Glass, by Mr. C. H. Jennings.

On an improved Mud-Boat, by Mr. Richard Perring.

On an Apparatus for those who have lost an Arm, by Captain G. F. Stack.

On Naval Improvements: viz. *a new Method of constructing the Rudder and Stern-Post; a Machine intended to answer the double purpose of becoming a spare Topmast Cap, and for forming Boats' Timbers and Knees, in order to repair Boats when Ships are at Sea, or in a Foreign Port; and a Chain Beam for strengthening Merchant Vessels;* by Mr. Wm. Hookey.

On Propelling Ships of War, by Captain James Burton.

On a Safe Coach, by Mr. Obadiah Elliot.

On a Sun Dial, by Mr. Griffith Davies.

On an Apparatus for saving Lives in case of Shipwreck, by Mr. Henry Trengrouse.

On a detached Clock Escapement, by Mr. William Hardy.

On Preserving Herrings, by Mr. J. F. Denovan.

There is also a supplement containing some explanatory matter relative to an *Improved Mathematical Dividing Engine*, invented by Mr. James Allan, and described in the 27th volume of the Society's Transactions. Also

explanatory References to Engravings in their 34th volume relative to Mr. BREMNER'S *Instrument for the Extirpation of Polypi;* to Mr. DICKSON'S *Method of Propelling Steam Boats;* and also an additional explanation of Mr. Russell's application (vol. 37) of Mr. Bramah's lock to the purpose of locking liquor cocks.

There are forty-one plates to this volume, most of which may be considered as *chefs-de-œuvres* of the art of engraving. But we think it is well worth this Society's while to consider, whether so much money as is necessarily spent in such exquisite engravings, may not be in part applied to a more beneficial purpose.

We understand that the expense of the *drawings and engravings* for this volume, amounts to about one thousand pounds!

Since the commencement of their session, besides the proceedings on the papers of Mr. Barlow, mentioned in our last, this Society has adjudged rewards for the following communications:

To Lieut. NICHOLAS, for his Semifoir and Telegraphic Dictionary, the Silver Medal.—To Mr. STEART, for making a superior kind of Thick Paper, for Drawing, the Silver Isis Medal.—To Mr. ALLSOP, for improved Gig Harness, the Silver Vulcan Medal.—To Mr. RIDER, for a Machine to cut Paper in Circular Pieces, for lining the Crown of Hats, called Hat Tips, Ten Guineas.—To Mr. REVELEY, for a communication respecting the use of Soap as a substitute for Oil in setting Razors upon a Hone, the Thanks of the Society.—To Messrs. NICHOLSON, for a specimen of Lithographic Printing, the Thanks of the Society.—And to Mr. BRANDT, for an Adjusting Crutch applicable to Pendulums, the Silver Vulcan Medal.

BRITISH INSTITUTION.

THIS Institution founded in 1805, and opened in January 1806, is now open. Its objects are to promote the Fine Arts of the United Kingdom, by the exhibition and sale of the works of Modern Artists.

We have been highly gratified with a few hours lounge in this gallery of paintings, which consists of more than 300 subjects.

To those who admire the astounding and terrific, mixed with the sublime *Belshazzar's Feast*, (Daniel c. v. Isaiah c. xv. 13.) by J. MARTIN, will afford ample materials for their gratification. This picture arrests the attention of almost every visitor, and that which so strongly attracts the attention of all must have merit; we understand that it has been sold for 800 guineas.

No. 254. *Chatelar singing the Triste amour, which made known to Mary Queen of Scots, to whom he was Secretary, that he loved her*, by H. FRADELL, is one of those pictures, which possessing truth and nature, we must ever behold with delight.

> Mais comme je suis en silence je soupire
> J' ôse bien aimer mais je n' ôse pas le dire.

No. 15. The *Bird-Trap*, by COLLINS, is well executed; we could almost scold the naughty boys for such well managed deceit.

No. 18. *A Scene in the Abbey Ground in Bury St. Edmunds*, by J. G. STRUTT, is, in our judgment, one of the best pieces in the gallery; it possesses truth and fidelity of colouring; and if it be a genuine copy of the spot which it designates, and which we do not happen to know, it is an exquisite nook of the earth.

No. 175. *Calais Pier, with the Dover Packet going out*, by C. M. POWELL, is perfectly characteristic.

No. 161. *A Gleaner*, by M. A. SHEE, is an exquisite picture done according to the nature of rural elegance; but for the label in the Catalogue we should never have taken the lady for a Gleaner; she has, it is true, an ear or two of corn in her hand, but her contour is that of the drawing-room; whence she might indeed have strayed to glean, *poetically*, not of necessity.

In No. 233. *The Poet*, by JOHN CAWSE, we have all the imaginings and the misery of many a fine but apparently wretched mind, presented to our view. We may here fancy a CHATTERTON, an OTWAY, or a BOYSE, his eye in a fine frenzy rolling, whilst his tattered cloathing and miserable dwelling remind us, that to the comforts, nay, to the common necessaries of life, many a genius is often a total stranger.

No. 191. *Scene in Windsor Forest*, by CHAS. DEANE, will please those who delight in Woodland Scenery.

No. 192. *View, Sheatley, Berks*, by J. TENNANT, is good.

Besides being pleased with the view of *Hawthornden near Edinburgh*, No. 194, by NASMYTH, it excites recollection of *Drummond*, and *Jonson*, who visited Hawthornden on foot, to see his cotemporary poet.

Amongst a variety of others deserving attention, and which we cannot particularize, we may mention, No. 3. *Warkworth Castle*, by THOMAS WERGE.—No. 35. *The Temple of Concord, at Agrigentum, in Sicily*, by W. SCROPE.—No. 38. *Solitude*, by J. F. ELLIS.—No. 48. *Rouen looking from the base of Mount Catherine, towards the Bridge of Boats*, by J. B. CROME.—No. 53. *Windsor from Eton Play-ground*, by C. DEANE.—No. 57. *Aberconway, from the Eastern Shore*, by J. M. GANDY.—

No. 79. *A View near Santa Barbara with the Conventa de Estrilla, Morning, in the Province of Andalusia, in Spain*, by H. LANDSEER.—No. 91. *Wood Scene with Cattle; Evening*, by G. BARRETT.—No. 103. *Crickhowel, South Wales*, by T. C. HOFLAND.—No. 126. *Pembroke Castle, South Wales*, by Geo. SAMUEL.—No. 142. *Landscape, Composition*, by J. M. GANDY.—No. 230. *A Soldier, relating his Adventures at the Battle of Waterloo; a Sketch*, by the late Edw. BIRD.—No. 260. *A Highland Piper in an English Village*, by A. FRASER.—No. 274. *Knaresborough Castle, Yorkshire*, by Chas. DEAN.—No. 276. *A Brook Scene*, by F. C. LEWIS.—No. 296. *A Ballad Singer*, by T. MILLICHAP; as having attractions, with which the lovers of painting and of nature cannot fail to be pleased.

We recognised also some old acquaintances in this gallery, with whom we have been pleased to have another interview; such as No. 27. *Bargaining for China*, by W. INGALTON.—No. 61. *A View from Kings Weston Hill, of the junction of the Avon and the Severn*, by G. SAMUEL.—No. 64. *The Proposal*, by R. FARRIER.—No. 242. *A View near Porlock, Somersetshire*, by G. SAMUEL.—No. 247. *The Stolen Kiss*, by W. KIDD.—No. 257. *Meg Merrilies*, by E. D. LEAHY.—No. 269. *Jeroboam's Idolatory reproved*, by H.P. BONE.—No. 283. *The Green Grocer*, by JOHN GRAHAM. No. 288. *Landscape Scene in Richmond Park, Sun-set*, by R. R. REINAGLE.—And No. 297. *A View under King's Weston Hill, Gloucestershire*, by G. SAMUEL.

An account of several of these will be found in our sketch of the Exhibition of the Royal Academy for 1820, in page 213 of our first volume, to which the reader will please to refer.

The British Public are under considerable obligations

to the Royal, Noble, and other liberal Patrons of the fine Arts, who have thus contributed to their amusement and gratification, in the formation of such a Gallery, the admittance to which is only One Shilling; and the deserving Artist must also feel considerable satisfaction in having his works thus exhibited, by which their merits become generally and publicly known and appreciated.

Royal Society.

On the 18th of January, a paper of Dr. Davy's was read, giving an account of two species of *Rana*, common in Ceylon, from which it appears that the bladder of these, the bull frog and brown toad, is a genuine receptacle of urine, which it receives from the Cloaca in which the ureters terminate; and that the urine is not at all analogous to that of other animals of the order amphibia, being very dilute, containing urea, certain salts, but no appreciable quantity of lithic. This peculiarity of urine acid, so well adapted to the size and structure of the bladder, is the more remarkable, as the favourite food of these animals is the same as that of small lizards, whose urine is of butyraceous consistence, and nearly pure lithic acid. Hence, and from other facts mentioned by the author, he adduces the conclusion, that the nature of the urine in every instance depends much more on the peculiar action and structure of the secreting organs, than on the peculiarities of die or of the circulating fluids.

At the same meeting a paper by Capt. Kater was read, entitled 'An account of the Comparisons of various British Standards of Linear measure.'

Jan. 25. The reading of the Bakerian Lecture by Capt.

KATER, on the form and kinds of Steel most proper to be employed in making magnetic needles, was begun.

An account of a micrometer, made of Rock Crystal, by G. DOLLOND, was also read: the improvement consists in making a sphere of Rock Crystal, and applying it in the place of the usual eye-glass of a telescope, and from its natural double refracting property, rendering it useful as a micrometer.

Feb. 1. The Bakerian Lecture on the best kind of Steel and form for a Compass Needle, by Capt. Kater, was concluded.

Feb. 8. A paper was read on the fossil bones, found in the Lime-stone Rock at Plymouth, by Mr. WHIDBY.

A paper by Dr. HENRY, on the aeriform compounds of charcoal and hydrogen, with some additional experiments on the Gases from Oil and Coal, was begun.

Feb. 15. The reading of Dr. HENRY'S paper was resumed.

At the same meeting a paper was read, by the Rev. Dr. ROBERTSON, entitled Observations of the Eclipse of the Sun, on Sept. 7, 1820.

A notice respecting a lunar volcano by Capt. H. KATER, was also read.

Feb. 22. Dr. HENRY'S paper, on the aeriform compounds of charcoal and hydrogen, was concluded.

The object first proposed by the Author was to examine the accuracy of those views of the compounds of charcoal and hydrogen, and especially whether there be a compound answering in its characters to light carburetted hydrogen gas, the existence of which had been called in question. This, after attentive examination, he pronounces to be a distinct chemical compound, having uniformly the same composition and chemical properties,

and the same specific gravity: 0,556. It consists of 100 parts by weight of charcoal united with 33.40 of hydrogen; while olefiant gas consists of 100 charcoal + 16.70 hydrogen. Hence, if the latter be considered as a compound of one atom of charcoal and one atom of hydrogen, carburetted hydrogen must consist of one atom of charcoal and two atoms of hydrogen. Thence, proceeding to examine the composition of oil and coal gas, the general issue of his experiments is, that oil gas is very far from being uniform in composition, but differs greatly in specific gravity and combustibility when prepared at different times even from the same kind of oil, owing to variations of temperature and other circumstances. Essentially the gases from oil and from coal are composed of the same ingredients, though in different proportions; viz. simple hydrogen, light carburetted hydrogen and carbonic oxide gases, with the addition of variable proportions of an elastic fluid, which agrees with olefiant gas in being condensible by chlorine, but consumes more oxygen and gives more carbonic acid by combustion, and has a higher specific gravity than olefiant gas, and even than atmospheric air. Whether this ingredient be strictly a gas (or a mixture of gases, or merely the vapour of a volatile oil, he leaves to be decided by a train of future experiments.

Mining Intelligence.

In December last the third of the new Steam Engines erected on the consolidated mines near Redruth in Cornwall, was put to work; two of them, are of a larger size than was ever before attempted. These engines have cylinders of 90 inches in diameter, the pistons make a stroke of 10 feet in the cylinder, and the centre of the

beams are so fixed, that the rods make an eight foot stroke in the pumps; thus they are able to raise a load of 85,000 lbs. Each of the engines is furnished with six wrought iron boilers, for producing high pressure steam, which is applied in the mode usually called expansive by engineers, and is condensed in the common manner. Three boilers are connected so as to be heated by two fires, and are sufficient to work the Engine, leaving three others to be applied when those which have been in use are cleaning or repairing.

These immense engines are executed in a very beautiful manner, and exhibit remarkable instances of accurate workmanship and sound calculation. Although they exceed in power all others that have been before constructed, each has from the first performed its office aright; they have worked repeatedly for days at the rate of 12 and 13 strokes a minute, and the whole has gone as smoothly as if a fly-wheel regulated the impulse. The effect of the first of these engines, which appears by monthly calculations which have been published, is to raise 38,500,000lbs. of water by each bushel of coals consumed; 3,800 bushels of which are consumed in 35 days, or 111 bushels per day.

The cylinder of one of the largest of these machines, exclusive of the cover and bottom, weighs about 12½ tons in one piece, it is surrounded by a case of still greater dimensions. The beam with its gudgeon weighs nearly 25 tons. The pump rods in the shaft, formed of the largest mast-timber which could be procured, are 16 inches square to a considerable depth in the shaft; when the whole are attached they will weigh, with the iron plates which connect them together, nearly 40 tons. When it is considered, that to this latter weight is to be added that of the column of water, and one half of the beam, we shall find nearly 100 tons on one side of the centre, and

of course a corresponding pressure on the other side to counterpoise it; so that there is suspended on the gudgeon and moving freely upon it nearly 200 tons. The whole reflects great credit on Mr. Arthur Woolf, by whom these engines have been erected.—*Annals of Philosophy.*

On the Chemical, Economical, and Medical Virtues of the Common Hop. By A. W. Ives, M. D. of New York.*

The hop or *humulus* is a hardy perennial plant which grows spontaneously in the Northern parts of Europe and America. It belongs to the class Dioecia and order Pentandria of Linnæus; the plant which bears the male flower is not cultivated, and is called the Wild-hop. The common domestic hop, which is the female plant, was the subject of Dr. Ives's investigation.

A quantity of hops was procured, which had been kept for domestic purposes in a small bag for three years. When they were taken frcm the bag there remained about two ounces of an impalpable yellow powder, which, by sifting, was rendered perfectly pure. This substance has probably been observed by most persons acquainted with the hop; and Dr. Ives suspects that it has been generally mistaken for *pollen*, but it is peculiar to the female plant, and is, probably, secreted by the nectaria: Dr. Ives calls it *lupulin.*

From various experiments on *lupulin*, Dr. Ives infers that it contains a very subtle aroma, which is yielded to water and to alcohol, and which is rapidly dissipated

* Abridged from an American Scientific Journal; the paper may be seen at large in the *Annals of Philosophy*, for March, 1821.

by a high heat; that no essential oil can be detected by distillation in any portion of the hop; that lupulin contains an extractive matter, which is soluble only in water; that it contains tannin, gallic acid, and a bitter principle which are soluble in water and in alcohol; that it contains resin which is dissolved by alcohol and by ether; and wax which is soluble only in alkalies, and in boiling ether; that it contains neither mucilage, gum, nor resin; that the aromatic and bitter properties of lupulin are more readily and completely imbibed by alcohol than water; and much sooner by both when they are hot, than when they are cold; that about five eighths of the whole substance is soluble in water, alcohol and ether; there being about three eights of it vegetable fibrous matter. These proximate principles exist in very nearly the following proportions. In two drachms or 120 grains of lupulin, there was of

	Grains.
Tannin - - -	5
Extractive matter - - -	10
Bitter principle - - -	11
Wax - - - -	12
Resin - - - -	36
A woody fibrous substance, or lignin -	46

Two drachms of the leaves, (by leaves are meant the calices which form the flower, or that part of the hop commonly used in brewing) from which all the lupulin had been separated, were digested 12 hours in six ounces of boiling water. The infusion was bitter, and exceedingly unpleasant to the taste; it possessed none of the aromatic flavour and peculiar bitter of the lupulin. When filtered and evaporated, it yielded five grains of nauseous extract. The same leaves were again digested in six ounces of proof spirit: after 12 hours the infusion

was filtered, and in evaporation yielded five grains of extract similar to the last. The same leaves were digested 24 hours in alcohol; the infusion manifested none of the sensible properties of the hop. It gave, by evaporation, four grains of extract. The taste of none of the extractive matter obtained from the leaves was sufficiently characteristic of the hop, to designate that it was obtained from that article.

From these and other similar experiments, Dr. Ives thinks it is conclusively proved, that the virtue of the hop resides exclusively in the lupulin; that the leaves contain a nauseous extractive matter, which is imparted to water and to alcohol, and which, instead of adding to the bitter and aromatic flavour of the lupulin, partially neutralizes or destroys it.

The obvious inference from these results was, that the lupulin was the only part of the hop essential to economical purposes; an inference so little anticipated, that it became an important subject of inquiry, whether that part of the plant was duly estimated by practical brewers; whether it had been regarded by authors as preferable to the leaves; and if so, what impediment or what consideration prevented its being separated from the chaff.

From these experiments, Dr. Ives was induced to ascertain the proportion of lupulin in the merchantable hop; and also, whether it could be completely and readily separated from the leaves. Six pounds of pressed hops were taken from the centre of a bag containing some hundred pounds, and exposed to heat till perfectly dry. They were then put into a light bag, and by threshing, rubbing, and sifting, 14 ounces of this fine powder were separated in a short time, and with very little labour; and though the quantity thus obtained was surprisingly great, there was obviously a considerable

portion remaining, which could not be easily separated from the chaff. If, therefore, the hops were gathered when the lupulin existed in the greatest abundance, and instead of being pressed and packed, were exposed to the sun till perfectly dry, there is little doubt but six pounds would yield a pound of the powder in question.

Two barrels of beer were made late in the spring, in which nine ounces of the lupulin were substituted for five pounds of hops. The result confirmed the most sanguine expectation. Though the quantity of lupulin was less than what usually enters into the same quantity of wort; and though the weather during the month of June was unusually warm, and therefore unfavourable to its preservation, still the beer, which is now five weeks old, is very fine, pleasantly aromatic and bitter, and in a perfect state of preservation.

To ascertain the preservative property of the lupulin by a more direct experiment, equal quantities of the beer were put into separate vials, and exposed, unstopped, to the sun. To the beer in one vial was added a scruple of lupulin. The beer to which none was added, became mouldy and sour in ten days; the other was unchanged at the expiration of fifteen days.

These experiments and their results are highly deserving the public attention.

As a *medicine*, either the *tincture* or *infusion* of lupulin may be given, according to circumstances, with more advantage than the hop in the way it is at present ordered. Dr. Ives recommends the saturated alcoholic tincture of lupulin in doses of from 40 to 80 drops, to produce sleep, which it will do, he says, with as much certainty as opium, in cases of long watching from nervous irritability; but the same cannot be said of its

efficacy in relieving pain. As a stomachic, a trial of lupulin is certainly desirable to be made.

On Magnetism.

It gives us much pleasure to observe the zeal and assiduity which has been lately manifested among philosophers relative to this subject. To the researches of M. Oersted, Sir Humphrey Davy, the French Savans, and Mr. Barlow, a communication from whom on this subject enriches our present number, and Mr. Lecount, we desire to call our readers' attention to the important discovery of the *North-west Magnetic Pole,* by the last voyage of Capt. Parry. By the accounts in the public journals, it appears that on the 4th of September, 1819, the expedition reached Copper-mine Roads. Previous to this the variation of the compass had changed from 124° W. to 166° E., the ships having, as was supposed, crossed the magnetic meridian in about 100° W. As the compasses there showed the ship's head to be N. E. and on all tacks, they judged themselves at no great distance from the magnetic pole. The compasses had indeed been perfectly useless from the time of their passing Lancaster Sound, which obliged them to steer by the sun when it was out, and how they could when it was not; often lying-to when the fog was thick. A paper by Colonel Macdonald has also been published in some of the journals on this subject, which is deserving of attention.

It appears that in the year 1576, the variation of the needle was at London 11° 15′ east; that it diminished gra-

dually till 1662, (1657 by other accounts) when it became nothing, or in other words, the magnetic needle pointed to the true north. In 1666 the variation was 0° 34′ west; since which period it has been increasing westward, but during the last three years it has remained stationary. In comparing its progress during similar periods, it does not appear that the rate of increase is equal, as it varies from one to two minutes, to a medium annual increase of 9′ 48″. In the Royal Society's Rooms, the mean variation in June, 1817, was 24° 17′ 54″; and in June, 1818, it was in the mean quantity, 24° 17′. In June, 1819, it was found to be 24° 15′ 23″; from which it would seem that it had begun to return. It was found by Capt. Cooke that the *same* observations, with the *same* compasses, in the *same* day, made a difference of five and six degrees; and nearly double the distance was found as a difference between the variation taken on ice, and on board ship in Baffin's Bay. This leads, Col. MACDONALD thinks, to a clear conclusion, that observations on *terra firma* can *alone* be depended upon for *real accuracy*. We are of opinion, however, that our knowledge of this subject is still too imperfect to enable us to draw any positive conclusion; and think it most wise to await the calm developements of future research.

From the dip of the needle it is probable, (we do not think it like Col. MACDONALD, *unquestionable*,) that the magnetic power or cause lies at some unknown depth under the surface of the earth. But we think even this probability should be entertained with extreme caution. It may ultimately turn out to be produced from some other cause. We must not be led away in philosophical researches by appearances only; least of all by common and popular opinions. And after all, is

it not as probable that it might arise from a cause pressing from above, as from attraction, as it is called, from below?

Col. MACDONALD says that it is utterly impossible [is not this assertion too strong,] to attempt to account for the constant increase in the variation, without supposing that the north-west magnetic pole has a constant motion round the north pole of the earth in longitude, on a parallel of latitude, or in an elliptic curve. Though the variation when first discovered was only 11° 15′ east, there can be little doubt, the Colonel says, that those who are destined to exist in the year 2040, or about that period, will find the variation as much east as it is now west. This is, we confess, probable; but we must be careful of assuming the fact.

The north-pole, the Colonel goes on to say, appears to attract more powerfully than the north-west magnetic pole, as must be the case on the supposition of a revolutionary movement indispensable for the formation of any tolerable theory of the variation. The great difficulty in the way of a theory of magnetic revolution, arises from the fact of no variation being found in some places. The solution of this difficulty may be found in a fair supposition that the north-pole, the moving magnetic pole, and the place of no variation on the surface of the earth, may be at the time nearly in one line. The Colonel found, by continued observations during two years, that the variation at Bencoolen was 1° 7′ to 1° 11′ east; the vibrating variation giving a returning swing of about four minutes of a degree. Capt. Cooke found the variation in the Straits of Sunda to be 1° west. At Condore in 8° 6′ north, and 106° 18′ east longitude, the variation was 0° 14′ west. Now these, and many other places of nearly no variation, are nearly in the line, vertical plane,

or section of the two poles; and consequently the variation must necessarily be little or nothing. The well known fact that the variation is constantly changing in one and the same place, furnishes no small proof in favour of the theory of the movement of the secondary magnetic cause, or north-west magnetic pole.

The variation in London was nothing, 1662, or 158 years ago. Supposing the newly discovered pole to be situated in 100° of west longitude, it would take 568 years, nine months, and eighteen days to effect its revolution, under the parallel of its supposed movement. In 243 years, the dip of the needle appears to have diminished in London only 59 minutes of a degree. This would seem to indicate that the movement of the magnetic pole is more in a straight line, nearly in an east and west direction, than in a circular or elliptical curve round the north pole of the earth. Bond makes the variation nothing in London, in 1657. The observations regularly taken by the librarian, at the Royal Society's rooms, may be relied on. From these it appears, that the west variation has ceased, or turned. The variation, therefore, has taken (allowing the change to have been in 1818) about 161 years to attain its utmost westing. It being reasonable to suppose, that the magnetic pole will move as far to the east as it has to the west of the meridian of London, the whole period of its movement, in a straight line within the earth from west to east, will be thus 322 years. In the year 1600, the variation at St. Helena was 8° east. In 1692, it was 1° west. In 1796, Colonel Macdonald found it there 15° 48′ 34″, 5; while in London, in 1795, it was 23° 57′. It is experimentally found, that the magnetic action, like that of heat, diminishes inversely as the squares of the distances: the action of the south pole,

combined with this cause, may go far in accounting for this anomaly.

The Colonel, in the conclusion of his paper, recommends that, when the discovery-ships are on their next voage to the polar basin, they should make it one of their principal objects to ascertain precisely the position of the newly-discovered magnetic pole.

The following observations have been collected relative to the dip of the needle, and the intensity of the magnetic force :

	Dip.	Intensity of the Magnetic Force.
Peru	0°0	1.0000
Mexico	42.10	1.3155
Paris	68.38	1.348
London	70.33	1.4142
Christiana	72.30	1.4959
Mendahl	72.45	1.4756
Brassa	74.21	1.4941
Hare Island	82.49	1.6939
Davis's Straits.	83.8	1.6900
Baffin's Bay	86.25	1.6685
———	84.39	1.7349
———	84.44	1.6943
———	85.54½	1.7383
———	86.9	1.7606

On Poisons.

We alluded to the subject of Poisons in our last volume, page 436, and as the part of the Family Cyclopædia of Mr. Jennings, on the subject of Poisons is now published, we think that the following tables from that work will be found extremely useful; in short they should be in the possession of every family in the Kingdom; and indeed of every one who understands the English language.

Substances.	*Symptoms.*	*Remedies.*
CONCENTRATED ACIDS: the vitriolic or sulphuric, nitric, muriatic, oxalic, &c.	Burning pain, vomiting, matter thrown up effervescing with chalk, salt of tartar, lime, or magnesia.	Calcined magnesia; one o pint of warm or cold water. ful to be taken every two min to excite vomiting. Soap, and water; mucilaginous dri wards; such as linseed tea, Arabic and water.
ALKALIES: potash, soda, ammonia, lime, &c.	Nearly the same: the ejected matter does not effervesce with alkalies, but with acids.	Vinegar or lemon-juice; a or two in a glass of water quently; simply warm water.
MERCURIAL PREPARATIONS: corrosive sublimate, &c. &c.	Sense of constriction in the throat; matter vomited sometimes mixed with blood.	White of eggs; twelve or fi beaten up, and mixed with a cold water. A glassful every nutes. Milk, gum water, lim
ARSENICAL PREPARATIONS: white arsenic, &c. &c.	Extreme irritation; pain, sickness, and speedy death, if the poison be not soon counteracted.	Warm water, with sugar; quantities, to excite vomiting water, soap and water, pearl water, mucilaginous drinks.
PREPARATIONS OF COPPER: brass, verdigris, halfpence, &c.	Symptoms nearly the same as from mercury.	White of eggs: mucilaginou See *mercurial preparations*, abo
PREPARATIONS OF ANTIMONY: emetic tartar, &c.	Extreme sickness, with other symptoms of poison, as above stated.	Warm water, or sugar and w terwards a grain of opium, drops of laudanum, every qu an hour, for two or three time
NITRE, or SALT-PETRE.	Obstinate vomiting, sometimes of blood, &c. &c.	The same as for arsenic, wit ception of lime water and alka
PHOSPHORUS.	Like mineral acids.	Like mineral acids.
LEAD: sugar of lead, Goulard's extract, &c.	Great pain in the stomach, with constriction of the throat, &c. &c.	Large doses of Glauber's or salts, in warm water.
BARYTES: the carbonate, muriate, &c.	Vomiting, convulsions, palsy, pain in the stomach, &c.	Half an ounce of Epsom or G salt, dissolved in a quart of wa veral glasses to be taken. In these salts large draughts of h water.
PRUSSIC ACID.	The most virulent of poisons, producing almost instant death when applied even in small quantities to the surface of the body.	Emetics: afterwards oil of tine, ammonia, brandy, with friction, and blisters.
SAL AMMONIAC.	Excessive vomitings, convulsions, pain in the bowels, alteration of the features, death.	Vomiting, to be rendered large draughts of warm sugar ter. If vomiting be not prod the poison it must be excited finger. Afterwards opiates.
GLASS, or ENAMEL.	If taken in coarse powder, produces irritation and inflammation of the bowels.	Large quantities of crumb o should be eaten. Afterwards tic of white vitriol, and de drinks.
ALCOHOL:— brandy, rum, gin, wine, &c.	Intoxication; when taken in large quantities insensibility, apoplexy, or paralysis; countenance swoln, and of a dark red colour; breathing difficult; often death.	A powerful emetic of white vi emetic tartar; vomiting to be e ged by warm water, and large of salt and water; bleeding; if t be very hot, cold wet cloths ma plied. If the extremities be cold,

tances.	*Symptoms.*	*Remedies.*
ING VEGE- POISONS :— od, meadow ecacuanha, bear's foot, . &c.	Acrid taste; excessive heat; violent vomitings; purging; great pain in the stomach and bowels. Externally applied, many of them produce inflammation, blisters, pustules.	If vomiting be produced by the poison, large draughts of warm water or thin gruel to render it easier. If insensibility be present, white vitriol, or other active emetic; after the operation of which, a brisk purgative. Then strong infusion of coffee, or vinegar, diluted with water.
cs :—opium, hemlock, , &c. &c.	Stupor, desire to vomit; heaviness in the head, dilated pupil of the eye, delirium, speedy death.	Four or five grains of emetic tartar, in a glass of water: if this does not succeed, four grains of blue vitriol, as an emetic. Do not give large quantities of water. *After* the poison has been ejected, give vinegar, lemon juice, or cream of tartar, and strong coffee.
NARCOTICS : ms ;	Nausea, heat, pain in the stomach and bowels; vomiting, purging, thirst, convulsions; cold sweats, death.	Three grains of emetic tartar in a glass of water; in fifteen minutes the dose to be repeated; after vomiting, frequent doses of Glauber's or Epsom salts, and stimulating clysters.
nica, St. Ig- n, the upas, dicus, &c.	None of these inflame the part they touch. Introduced into the stomach, or applied to wounds, they are rapidly absorbed, producing, generally, rigidity, convulsions, and death.	The emetic as under mushroom; lungs to be inflated. Two ounces of water, one drachm of ether, two drachms of oil of turpentine, and half an ounce of sugar, mixed together; two spoonfuls of which to be taken every ten minutes.
ous FISH :— obster, crab, conger eel, c. &c.	In an hour or two, or sooner, after some fish have been eaten, more especially if stale, weight at the stomach, sickness, giddiness, thirst, &c. come on; in some cases death.	An emetic; vomiting to be excited by tickling the throat with the finger, and by draughts of warm water. After vomiting, an active purgative. Afterwards vinegar and water, or water sweetened with sugar, and an addition of ether. After the evacuations, laudanum.
ous SER- the viper, or rattle-snake,	A sharp pain in the wounded part, soon extending over the body; great swelling, first hard and pale, then reddish; faintings, vomiting, convulsions; inflammation, often extensive suppuration, gangrene, and death.	A moderately tight ligature to be applied above the bite, and the wound left to bleed, after being washed with warm water. The actual cautery, lunar caustic, or butter of antimony, to be applied. Then lint dipped in equal parts of olive oil, and spirit of hartshorn. Ligature to be removed if the inflammation be considerable. Warm diluting drinks, with small doses of ammonia or hartshorn, to cause perspiration. The patient should be well covered in bed, drinking occasionally warm wine. If gangrene threaten, wine and bark must be given freely.
FLIES.	Nauseous odour of the breath, burning heat in the throat and stomach; vomiting, often bloody; bloody stools; painful priapism, heat in the bladder, convulsions, delirium, death.	Vomiting freely excited by sweet-oil, sugar and water, milk, or linseed tea; emollient clysters. Camphor dissolved in oil may be rubbed over the belly and thighs.
ous INSECTS : a, scorpion, wasp, bee,	In general only a slight degree of pain and swelling; sometimes sickness and fever.	Hartshorn and oil, salt and water; a few drops of hartshorn may be taken internally in a glass of water. The sting may, in general, be removed by making a strong pressure over it with the barrel of a small watch-key.

*On the Pyrolignous Acid, its Manufacture and Uses.**

The manufacture of this acid is conducted on a large scale at Neath, in the neighbourhood of Swansea. The furnaces are made about 5 feet by 3, and 6 feet deep, sufficient to contain for each charge about 15 cwt. of wood; the door is made air-tight, by means of a luting of clay and horse dung, and is not opened for twelve hours; the fire underneath is raised just sufficient to produce a slight glowing heat on the floor of the furnace. All kinds of wood are made use of; the drier the wood, the stronger the acid. When the distillation is completed, what is left in the furnace is Charcoal, which constitutes about one third in weight of the wood employed; each ton of wood yields about 100 gallons of liquor, consisting of weak acid, tar, and naphtha; the remaining loss arises from the gaseous products. The acid corresponds in all its properties to acetic acid.

After rest a partial separation takes place; a denser tar falls to the bottom; the lighter naphtha floats at the top; the acid occupies the middle part, from which place it is drawn off; in this state it is a little mixed with portions of naphtha and tar, and is denominated by the manufacturer the black acid: for if it were in this state employed in the manufacture of sugar of lead, it would produce a very discoloured article. By distillation the acid becomes more concentrated and purified; it is in this stage, that portion which is sold to the vinegar makers is saturated with chalk; the solution drawn off and evaporated to dryness is exported in the form of acetate of lime. For

* From a communication by Dr. Wilkinson, to the Bath and West of England Society, and read at their Annual Meeting on the 19th of Dec. 1820.

the manufacture of the acetate or sugar of lead, the acetate of lime is put into an iron still; sulphuric acid diluted with an equal quantity of water is added in such a proportion as leaves an excess of sulphuric acid. The acetic acid is distilled, and the sulphute of lime or gypsum formed in the operation is left in the still.

The acid drawn off is subjected to another distillation; in this state it is highly concentrated, and the 100 gallons of liquor produced in the first distillation is reduced to about 30 gallons of strong acid. In this state it will dissolve nearly half its weight of litharge, which is added to the vinegar whilst cool; during its admixture there is an increase of temperature of near 60 degrees; in this stage no heat is employed. If the acid were warmed there would not only be a considerable loss from evaporation; but the litharge instead of being dissolved would form a hard cake or mass; the manufacturer soon ascertains the point of saturation: he distinguishes by the smell an excess of either acid or litharge. If the mass is too thick to let the impurities subside, as much water is added as is equal to the acid employed; after being well stirred, it is left for 24 hours to depurate, then drawn off and boiled down to concentration, which is determined by taking out a small portion in a capsule and observing whether it solidifies on becoming cool; it is then drawn off into casks, holding about 6 or 7 cwt. In about five or six days it becomes solid, at the end of which time a hole is made at the top, into which a syphon is introduced, in order to draw off the mother water from the central part; it is then broke up, picked and sorted for the calico printers.

From some experiments which have been made, the purified acid has not been found to answer the same pur-

poses as vinegar, in the processes of pickling vegetable matter; in its pure state it is so highly concentrated as completely to decompose onions, cucumbers, &c.; nor will it answer by reducing it by admixture with water. It appears, however, that for the preservation of animal food this acid is admirably suited. In the preservation of hams, when a reduced quantity of salt is used for smoke drying them, the acid is mixed with the pickle in the proportion of about two table spoonfuls for a ham of ten or twelve pounds; and when taken out of it previously to its being hung up, it is painted over with the acid, by means of a brush. Tongues are also cured in the same manner; and so also salmon; beef steaks have been kept in a plate, the bottom of which was covered with the acid, for six weeks being turned every day, without the least tendency to putrefaction.

This acid is very readily and cheaply prepared; more than 70 gallons of acid, sufficiently strong are procured from a ton of wood; a gallon is sufficient to preserve 2½ cwt. of pork, beef, and most animal substances, with the addition of a comparative small portion of salt, not only affording a considerable saving in that article, but also materially contributing to the increase of flavour and nutritive quality. Ham or beef cured in this way require no previous soaking in water to being boiled, and when boiled swell in size, and are extremely inculent.

At the last anniversary of the *Whitehaven Philosophical Society*, two specimens of meat cured by the pyrolignous acid, were exhibited. They were prepared on the 7th of September, 1819. One was hung up at home, and the

other sent out to the West Indies, to try the effect of climate upon it, and brought back on the return of the ship to that port. Both specimens were pronounced, by all present who tasted them, to be perfectly fresh, sweet, and fit for use, after a lapse of 15 months

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Exhibition of the Engravings of Living British Artists

WE are happy to have it in our power to announce that a *Plan for the Exhibition of the Engravings of Living British Artists, under the immediate Patronage of his Majesty*, has been for some time maturing, and we understand it is so far complete, that a room has been engaged in Soho Square, and will be opened to the public in the course of the next month. This attempt in thus bringing to notice the efforts of our native talent in this department of the arts, has met with the strongest encouragement from very many of the nobility and gentry, and to which we cannot but wish every possible success. We shall not fail to take due notice of this Exhibition in our next number.

Lithography.

A very useful little work has been just published, to which we are desirous of directing the reader's attention, and particularly the attention of those persons to whom the art of lithography is interesting.* This work ap-

* A Manual of Lithography, or Memoirs of the Lithographical Experiments made in Paris, at the Royal School of the Roads and Bridges; clearly explaining the whole art, as well as the accidents that may happen in the printing, and the different methods of avoiding them; translated from the French by C. Hullmandel.

pears, in the compass of 138 octavo pages, to combine more information on the subject of which it treats, than many a bulky quarto, with considerable more pretension. In the limits to which we are restricted, we cannot give even an outline of the work, but the observations on the choice of *lithographic-stones* are deserving the attention of every artist who is desirous of improving in this novel art.

" Any stone which effervesces with an acid, which imbibes water with facility, and is easily penetrated by greasy substances, is fit for lithography. It is well known that carbonate of lime fulfils these conditions; next to silex lime is the earth found in greatest abundance on the surface of our globe, and chiefly in the state of carbonate. It is found first in masses in primitive beds, and almost always of a white colour, and in a pure state; secondly, in transition beds, in masses of different colours, proceeding from the detritus of the first, such are marbles; thirdly, in beds of latter formation; in these it is found in abundant strata, but it is necessary to choose amongst these, as these beds or deposits formed by water, are almost always of a coarse texture, intermingled with crystals, or filled with shells. By this it is easy to see that lithographic stones are not scarce; from the coarse calcareous stone which serves for buildings, to the compact calcareous ones which receive the polish of marble; an infinite variety of other stones exist, which contain with lime, silex and alumina, and the two latter even in excess, and which are all, more or less, proper for lithography. The following are the rules by which the best may be selected:—

The best lithographic stone hitherto found breaks with a conchoidal fracture; it is of a fine homogeneous texture, its colour is of a uniform yellowish white, being

nearly similar in appearance to the hone stones used in sharpening razors; on breathing on them, a slight aluminous smell (similar to that of pipe clay) is perceived.

FRANCE.

At a late sitting of the French Academy of Sciences, the following papers excited particular interest:—

A letter from M. Pexans, an officer of artillery, renewing his plan for destroying a ship of the line of the first rank, by a small boat conducted by a few men.

A very curious memoir by M. Biot, on electro-magnetic phenomena, the idea of which originated with Professor Oersted, of Copenhagen.

An historical sketch, read by Captain Freycinet of the voyage he performed round the world, and which notwithstanding the accident that occurred to his ship, is expected to furnish infinite requisitions to the sciences of astronomy, geography, and natural history.

GERMANY.

Mr. John David Passavent of Franckfort, an able artist, at present residing at Rome, has lately published a work under the title of *Ideas on the Arts of Design*, and an account of their progress in Tuscany, for the purpose of fixing the point of view under which the German school of painting is to be considered.

This work contains views on the object and origin of Art in general; considerations on the insufficiency of the present academies of art, and proposals for better pro-

moting the progress of the arts. The author contends that art is a national affair; that its importance depends on the public lip, the liberal or confined notions of nations; that its interest is but little promoted by the education of young men expressly as artists, but very much by the execution of great, and, as much as possible, public works.—*Literary Gazette.*

Some curious and interesting observations have recently been published by Dr. KERNER, of Wirtemberg, respecting the probable existence of a species of animal poison not hitherto known. He says that the smoked sausages, which are so favourite a food with the inhabitants of Wirtemberg, often cause fatal poisoning. The effects of the poison occasionally manifest themselves every spring, in the month of April, in a more or less alarming manner. He states that of seventy-six persons who became sick from having eaten those sausages, thirty-seven died in a short time, and several others remained ill for years. The sausages made with liver appear to be most dangerous. What this poison is remains to be developed.

HOLLAND.

THE Provincial Committee of Medical Police at Amsterdam, proposed in 1819, the following question:—"What are the causes that persons drowned, suffocated, or hung, who have been recovered from apparent death, often become soon after a prey to a real death? What means must be employed to prevent this misfortune?"

Only two memoirs have been received which answered to the conditions, one in French, the other Dutch. The latter with the motto, "*Aër in omnibus quæ accidunt maximus et auctor, et dominus est,*" was so superior in every respect to the others, that the Committee without hesitation, adjudged it the prize. The author is M. H. J. Schouten, Doctor of Physic, at Amsterdam.

New Patents Sealed in 1821.

To Alphonso Doxat, of Bishopsgate-street, London, Esq. in consequence of a communication made to him by a certain foreigner, of a new combination of mechanical powers, whereby the weight and muscular force of men may be employed to actuate machinery for raising water, or other purposes, in a more advantageous manner than has been hitherto practised.—Sealed 27th January. Six months to enrol.

To Phillips London, the younger, of Cannon-street, Practical Chemist, for certain improvements in the application of heat to coppers and other utensils.—Sealed Feb. 3. Six months to enrol.

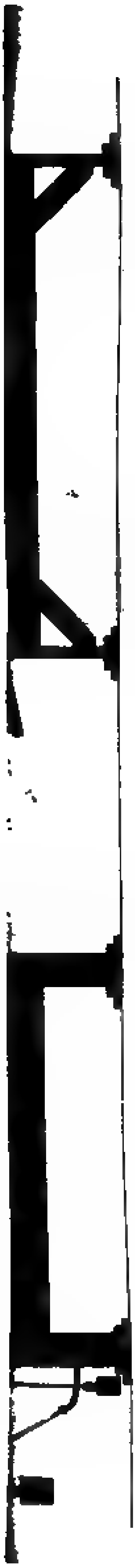
To William Aldersay, of Homerton, Gentleman, for improvements on steam-engines and other machinery where the crank is used.—Sealed Feb. 3. Four months to enrol.

To George Vizard, of Dursley, Clothier, for a new process or method of dressing and polishing goods of woollen manufacture.—Sealed Feb. 3. Two months to enrol.

To Thomas Masterman, of Broad-street, Ratcliffe, Brewer, for certain machinery for the purpose of imparting motion to be worked by steam and water, without either cylinder or piston, and with less loss of power than occurs in working any of the steam-engines now in use.—Sealed Feb 10. Four months to enrol.

To Robert Stein, of Walcot-place, Lambeth, Brewer, for certain improvements in steam engines.—Sealed Feb. 20. Six months to enrol.

To James Foster, of Stourbridge, Iron Master, for certain improvements in the manufacture of wrought or malleable iron.—Sealed Feb. 20. Six months to enrol.



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No. IX.

Recent Patents.

To Robert Bowman, *of Manchester, for Improvements in the construction of Looms for Weaving various sorts of Cloth; which Looms may be set in motion by any adequate power.*

The improvements proposed by this patent, consist of certain novel arrangements of machinery, applicable to power-looms: that is, to looms worked by the steam-engine, water-wheel, &c.; which improvements render such power-looms proper for weaving those sorts of cloths of cotton, flax, wool, or silk (or a mixture of those materials) which are called *fustians*, such as velvets, velveteens, corderoys, woollen-cords, &c. all which cloths being of the nature of *twilled* and *tufted* cloths, require the loom to be mounted with several *heddles* to divide the warp.

The manner in which power-looms have been hitherto constructed, does not admit of employing so many heddles as are requisite for weaving those kinds of cloth

without very great complication, and consequently the hazard of derangement. The present improvements are described by the patentee as consisting of such simple modes of connecting or harnessing the heddles of power-looms, and such an effectual mode of applying the *tappets*, or *wipers*, to draw down the heddles, that he is enabled to manufacture the before-described cloths by power-looms with the same facility and perfection that they could be produced by hand-weaving in the usual manner.

In the ordinary construction of the power-loom employed for weaving plain cloths, only *two* heddles are required for dividing the warp, which work alternately up and down, and are made to counterpoise each other. But when more than two heddles are used for the purpose of dividing the warp irregularly, as in the production of twilled cloths, then they cannot be made to balance each other, and require a more complicated harness.

One part of the improvement consists in a new manner of connecting the heddles in power-looms, by which they are kept all in a proper state of tension. Another part of the improvement consists in a new method of applying the wipers or tappets which give motion to the heddles, so as to produce both the lowering and raising of them.

In order to render those improvements more evident, the inventor has given a description of the complete power-loom having the new part attached in a manner suited to the weaving of velveteens with six shafts or heddles. The apparatus consists of the following parts: A frame to be made of cast iron (see Plate VII.) fig. 1, a side view, and fig. 2, a front view of the loom; *a*, the conducting roller at the back of the machine over which the warp is passed and drawn tight by the yarn roller *b*,

straps attached to arms are passed over two large pulleys, each on the ends of the yarn roller, which are tightened by means of weights for the purpose of giving proper tension to the warp *c*, *c*, by producing a sufficient friction on the roller as the warp is drawn forward; *d*, *d*, are the heddles of which there may be six, one behind the other; the warp threads are conducted through the eyes of these heddles, so that by lifting some and depressing others the warp is separated into two sheds, between which the shuttle passes; *e*, is the reed fixed to the lay *f*, through this reed the warp threads pass, and are divided. The lay *f*, is suspended by its arms, or levers, to an axis above, and swings thereon in order to beat up the weft and form the cloth.

The cloth produced by the interweaving of the warp and weft, passes over the breast-beam shewn by dots at the front of the loom over the letter A, fig. 1, and thence descending is wound up round the cloth roller *g*. This roller is turned by means of a cog-wheel upon its axis, which takes into a pinion upon the axis of a ratchet wheel *h*; into the teeth of this ratchet falls a click or catch *i*, which is raised by means of a weight attached to the short arm of the lever, and depressed by the action of one of the heddle levers, connected to it at the bottom of the machine. By these means as the lever rises, the click pushes the ratchet wheel one tooth forward (which is prevented from running back by another click, or paul, shewn by dots) and hence the cloth is progressively drawn over the breast beam and wound on to the roller *g*.

The whole of the machinery is put in motion by means of a band leading from any first mover, which band passes over the pulley *k*, fixed upon the main axle of the machine *l*. By the side of this there is a loose

or sliding pulley for the band to be slipped on to, when the action of the machinery is intended to be stopped. Upon the main axle of the machine *l*, (shewn by dots at fig. 2) there are two cranks *m*, from which two crank rods *n*, lead to the lower part of the lay *f*, and hence produce its motion. The main axle *l*, performing about 90 revolutions per minute, by means of the band wheel *k*, causes the lay *f*, to swing backward and forward with the same rapidity through the agency of the cranks and crank rods *m* and *n*.

The operation of *pecking*, or throwing the shuttle, is effected by the vibratory motion of the lay, (as will be shewn hereafter) which on being pushed backward projects the shuttle along the shuttle race in front of the reed; the race and reed being part of the swinging lay. At each end of the shuttle race is a trough or box, for the reception of the shuttle; as seen in the horizontal view fig. 4, over which there are straight wires *o*, *o*, fixed horizontally to the lay, and seen over the shuttle box fig. 2; upon these wires *o*, *o*, the peckers *p*, *p*, slide: these peckers re intended alternately to strike the shuttle, and drive it with great rapidity from one box to the other through the divided warp: *q*, *q*, are upright levers attached at their lower ends to the peckers *p*, *p*, which levers are connected above by joints to the axle of the lay. The action of this particular part of the machinery will be best seen by the representation of the lower part of the lay, fig. 4, and the levers above in fig. 3; *r*, *r*, are curved brackets extending from the arms of the lay; to the ends of these brackets short horizontal levers *s*, *s*, are connected each by joints, behind which a spring is applied to force the lever outward, and by means of the links *t*, *t*, these horizontal levers, and the pecker levers *q*, *q*, are connected together, as seen in fig. 1 and 2, the mo-

tion of the lever *s*, being thus communicated to the pecker below, as will be next explained.

v, v, are two inclined planes attached to the upright standards of the machine, by their frames and pivots *v** fig. 1, where one of them is seen resting upon the end of the lever *u*, (which crosses the machine in fig. 2.) Against one of these inclined planes, when the lay is pushed back, the roller upon one of the levers, *s*, strikes, (as seen at the right hand end of fig. 3,) and hence by pulling the link *t*, and with it the pecker lever *q*, a very smart stroke is given by the pecker *p*, to the shuttle in the box below, by which means the shuttle is projected across the shuttle race. The same effect takes place on the opposite side of the machinery, by the returning stroke of the lay, when the shuttle is sent back again; this action continuing as long as the lay oscillates, which it will do while the main axle is kept revolving. The alternate rising and falling of the two inclined planes *v, v*, resting upon the ends of the lever *u*, is effected by means of a lifting rod *w*, attached to the lever *u*, which rises and falls by the agency of an excentric upon the axle of the small cog wheel *x*, which makes only one revolution to two of the main axle.

If the shuttle should by any cause stop short in its course, and lodge between the warp threads, there is a provision, by which the action of the machine will instantly cease, and without this provision, under such circumstances, the threads or the reeds must be inevitably broken. Near each end of the lay is a stop *y, y*, attached to an axle lying along the front of the shuttle race. Each of these stops is slightly pressed by a spring against pieces of wood, or horizontal levers *z, z*, placed in slits, in the front of the boxes of the shuttle race. If the lay goes back, the shuttle being in the box or trough, the

stop *y*, (formed as a double lever) will be so far forced out, and its point depressed by the resistance of the wooden lever *z*, bearing againt the shuttle in the box, that its point will then pass beneath the block *A*, fixed upon the frame under the breast beam. But if the shuttle is not in the box, the spring will have raised the point of *y*, (by the lever *z*, giving way) and the point of the stop will strike against the block *A*, and catch the lay in the middle of its course, which circumstance pushes the band that communicates the motion to the machine off the fixed pully into the loose one, and the whole machine ceases to act.

Thus far is described the construction and action of the ordinary power-loom already in use, to the invention of which the patentee lays no claim. We shall now proceed to explain his improvements, which consist as before expressed, of a new manner of connecting or harnessing the heddles, and in the manner of giving motion to them. The heddles *d*, *d*, (of which there are six as before said) are suspended by cords which proceed from the extremities of the levers *B*, at the top of the loom, and are also attached in a similar manner to the extremities of the levers *C*, at the bottom of the loom. The outer ends of these levers are connected by cords or rods, which brace the heddles to any required tension, and being equipoised are free either to rise or fall, without causing any unnecessary strain upon the warp. The movement for raising and lowering the heddles, is obtained by means of two sets of tappet-wheels, or rosets *D* and *E*, as many in each set as there are heddles, which tappet-wheels are fixed upon two axles, one above, the other below the main axle of the machine.

The tappet-wheels are turned by means of a pinion *I*

upon the end of the main axle of the machine, which takes into the cog-wheels fixed upon their axles; and each of the tappet-wheels are designed to make one revolution to nine shoots of the shuttle. *F*, *F*, are levers upon one common fulcrum at *G*, equal in number to the tappet-wheels. Upon each of these levers are arms extending at right angles, and carrying rollers which work into the inequalities of the tappet wheels, as shewn by dots at *H*, *H*, fig. 1. By these means as the tappet-wheels go round, the respective levers *F*, *F*, are by their inequalities raised and depressed, which being individually connected at their extremities to the cords or rods that connect the levers *B*, *C*, and the heddles *d*, *d*; the warp threads are also alternately lifted and depressed according to the disposition of the tappet-wheels, the elevations upon which are so arranged that, at every shoot of the shuttle, they will cause such of the levers *F*, and *C*, to descend and such to rise as are required for the production of the particular article. For weaving any different sorts of cloth, a greater or less number of tappet-wheels and heddles are required.

Inrolled, January, 1821.

To John Wakefield, *of Ancott's Place, Manchester, for certain improvements in the construction of Furnaces for Boilers of various descriptions, and in the mode of feeding the same with Fuel, which improvements are calculated to lessen the consumption of Fuel, and to burn the Smoke.*

The first part of these improvements consists in a particular mode of placing cheeks or stops in the flues of fur-

naces, for the purpose of impeding the progress of the flame and heated vapour, in order that time may be allowed for it to give off its heat to the boiler. The Patentee observes, that, before the date of this patent, he was in the practice of introducing *cheeks* behind the breast of the furnace, at right angles to the sides of the bed or bottom part of the flue. His present invention and improvement is, that he makes those cheeks next to the breast to stand obliquely receding from the front, and those cheeks which are placed in the farthest part of the flue, to stand obliquely inclining towards the front, by which the egress from the flue may be impeded. The cheeks consist of partitions of brick-work, extending from the sides of the flues to rather more than half way across; their inclined positions cause the first pair to conduct the second pair, and to retain the heated vapour under the boiler, in a manner better calculated to produce the desired effect of heating the vessel, than if they were placed at right angles. The number of these cheeks, so disposed, may be four, or six, according to the length of the boiler.

In the front of the breast, there is a curb or projection towards the fire intended to impede the progress of the unconsumed smoke, which would otherwise pass off quickly with the heated vapour into the flue, and being deprived of its oxygen, would escape unconsumed. But by means of this curb the smoke is arrested in its progress, and, at the same time, is met by a current of fresh air, supplied through blowers leading from the ash-pit to that part of the furnace, by which means it is forced back down upon the fire, and its combustion effected.

The second part of the improvement consists in placing the bars of the fire grate radiantly, that is, much closer together in the front than at the hinder part. The ad-

vantage of this arrangement is, that the small coals are prevented from falling through the grating at the time of feeding, and get coagulated together before they are pushed to the further part of the grate. This disposition of the bars, however, the inventor observes, he had exercised prior to the date of his patent, and therefore does not claim it, but has since introduced an improvement upon it, which forms a part of this patent; viz. instead of laying all the bars radiantly, he now lays from three to six of the bars (according to the width of the grate,) parallel to each other, on the sides of the grate, placing the radiant portion of the bars in the middle of the grating. The reason of placing these side bars parallel, is for the purpose of allowing the teeth of a rake to be passed along the side of the grate between these bars, by means of which the coals are pushed to the back part of the fire. This rake may run in and out upon a roller, and rise and fall upon pivots, and, if required, be worked by a rack and pinion, or in any convenient manner.

Inrolled, December, 1820.

To Thomas Dyson, *of Abbey Dale, Sheffield, Yorkshire, for his improvements of Plane Irons and Turning Chisels.*

The improvement proposed in this specification, consists in forming the cutting irons for planes of sheet steel, with a slit partly down the middle, and open at the back or blunt part; which cutter is to be held beween two pieces of metal screwed together, the confining screw passing through the slit of the cutter. In this mode of attaching

the cutter, it may be readily shifted or displaced by unscrewing the two pieces of metal, and, when drawn out, may be sharpened and again replaced as before. The contrivance is also applicable to turning tools, which are to be attached to, and removed from, their handles, by the means above described.

Inrolled, January, 1821.

To GEORGE VIZARD, *of Dursley, for a new process or method of Dressing and Polishing Goods of Woollen Manufacture.*

THIS patent is obtained for the introduction of pumice stone, as a substitute for teasels or wire cards, to be used in the operation of dressing, smoothing, or polishing woollen cloths. The improved apparatus consists of a wooden box or tray, about sixteen inches long, four inches wide, and two inches deep, into which are glued or cemented pieces of pumice stone, or light porous lava; which pieces are to be made level on their upper sides by rasping, and are to project about half an inch above the edges of the tray: in affixing these pieces, such cement as will resist water is to be preferred.

The boxes, or trays, when thus prepared, are to be attached to the cylinders, or gig-mills, and other machines used for dressing woollen cloths, in the construction of which, trays, wood or metal, may be employed, and the pieces of pumice may be confined in them by means of wedges and screws, instead of cement, if preferred.

Inrolled, April, 1821.

To William Kendrick, *of Birmingham, in the County of Warwick, for his combination of apparatus for extracting a tanning matter from Bark, and other substances containing such tanning matter.*

The process employed under this patent is stated in the specification to be as follows:—" Expose to the action of steam or water, heated considerably above the common boiling point, the fresh, or waste oak bark, sumach, or other material from which the tanning matter is to be obtained."

The apparatus (of which there is no specified form or dimensions,) consists of a boiler, capable of generating steam of a certain elasticity, and of conveying the steam in the same state of elasticity into a vessel containing the oak bark, or substance from which the tanning matter is to be extracted. A more particular explanation of the apparatus is said to be unnecessary, because any steam vessel capable of generating steam of a higher temperature than that of boiling water, will answer the purpose. The elasticity of the steam applied for extracting the tanning matter from the materials operated upon, must be such that its pressure is equal to at least from eight to twelve pounds upon the inch.

The vessel in which the material is placed for obtaining the extract, may be of wood or iron, lined with lead; and the more perfectly steam tight it is made, the greater will be the quantity of the extract produced. A safety valve is to be placed in the lid of this vessel, and also in the boiler. To the steam-pipe is connected a perforated tube, which is to be of sufficient length nearly to reach the bottom of the vessel containing the bark, the design

of these perforations is, that the steam may act with greater effect upon the bark than it otherwise would do.

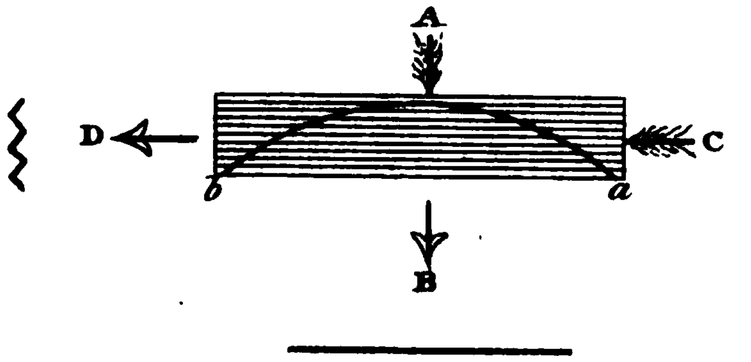
It is further stated, (and which we do not understand,) that "to *facilitate* the operation, warm or cold water is put to the bark, in such proportions, from one quart or more to a pound, as may be thought proper, according to the strength of the liquor desired to be drawn."

Inrolled, April, 1821.

This is one of the many patents, of the awkwardness and want of clearness in the specification of which, we have often so much reason to complain. There appear to us only two probable motives for the enrolment of these wretched documents: one is the wilful determination of the patentee to mislead and deceive the public, in order to retain all the emolument, after the expiration of the patent, to himself; and which, we fear, is sometimes the only motive: the other is the utter ignorance under which the document itself is often drawn up, and which sets at defiance all science as well as common sense. To which of these the present patent belongs, we do not pretend to determine; but, surely, when a privilege is granted, the public have an undoubted right to be explicitly told for what. We wish Patentees who cannot commit their ideas to paper in an intelligible manner, would make it a point to consult persons who understand the subject of their respective patents, and who are also capable of describing in an intelligible manner that subject in the specification. It is not sufficient, it should be remembered, that the Patentee understands his specifications himself; this instrument is intended for the ultimate use of the public, and if the public cannot understand it, it is to that public a useless document.

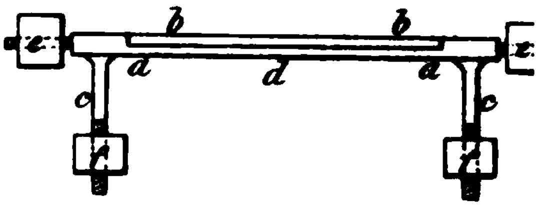
Varleys, Lense.

Fig. 2.



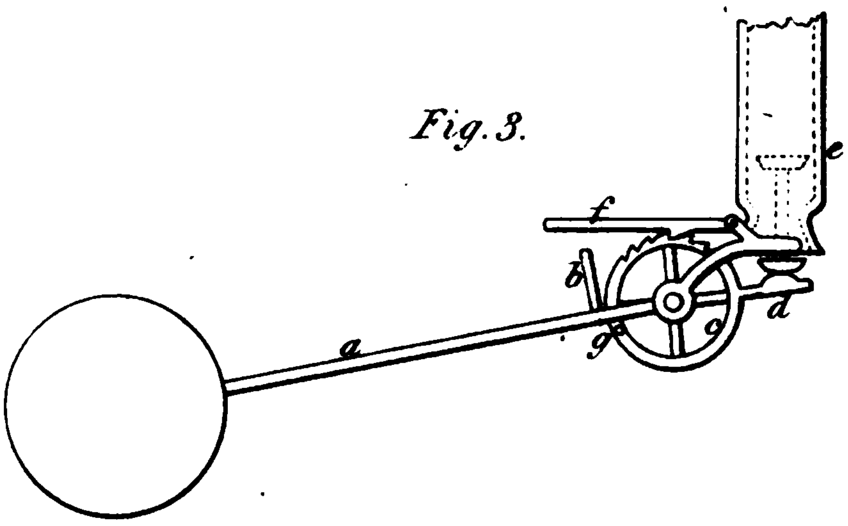
Arnolds, Ballance

Fig. 1.



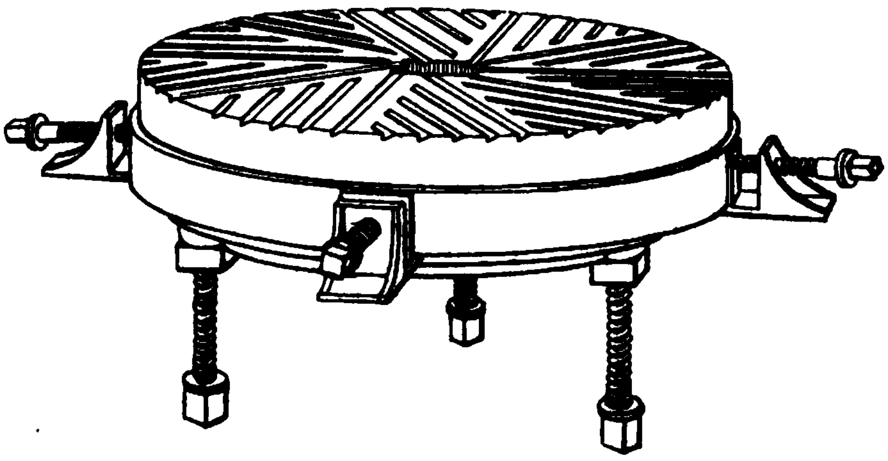
Ball Cock.

Fig. 3.



Austens, Bedstone of a Corn Mill.

Fig. 4.



W. Newton, del.

G. Gladwin, sc.

To THOMAS PREST, *of Chigwell, Essex, for a New and Additional Movement applied to a Watch, to enable it to be wound up by the Pendant-Knob, without any detached key or winder.*

A rose-head, or knob, placed within the bow of the pendant, is fixed to a pin which passes through the shank of the pendant. Attached to the end of this pin there is a bevel-pinion taking onto a small-toothed wheel lying upon the pillar-plate immediately under the dial-plate. Another toothed-wheel of equal diameter, and having the same number of teeth, is fixed upon the fuze, and which takes into the teeth of the last-mentioned wheel. So that by turning the rose-head, or knob, on the outside, the bevel-pinion causes the first described toothed-wheel to turn the wheel upon the fuze, and hence the watch is wound up, there is of course a stop to prevent the works from being over wound.

Inrolled, December, 1820.

We have repeatedly mentioned our regret that inventors so often neglect to avail themselves confidentially of the knowledge and experience of such persons as are more conversant with mechanism than themselves; this contrivance is not only well known to watch-makers, but has been the subject of a Patent granted many years ago, and we believe may be seen in some of the Encyclopædias.

To ROGER ARNOLD, *of Chigwell, Essex, for an Invention of a New or Improved Expansion Balance for a Chronometer.*

THE form of this balance is shewn at fig. 1, Plate IX. in which *a*, is a bar of steel, having on the top of it a slip

of brass *b*, melted onto the surface of the steel. This slip of brass extends no further than to the shoulders where the steel arms *c*, *c*, are rivetted to the steel bar. In the centre of the bar at *d*, is a hole in which the pivot works, that is, the point upon which the balance oscillates. The upper weights *e*, *e*, are adjustable by screwing upon the steel bar for the purpose of regulating the mean rate of the balance. The weights *f*, *f*, are also adjustable by screwing up or down the steel arms for the purpose of regulating according to temperature.

Now supposing the weights so regulated that the balance acts truly, and beats mean time, the thermometer being at temperature. If the heat increases, the brass being more susceptible of variation than the steel bar *a*, the slip *b*, will become elongated and bend itself, and the steel bar into a bow or curve swelling upward, by which the arms *c*, *c*, and the weights *f*, *f*, will be bent inwards. Hence, though the heat has expanded the balance, which would naturally cause it to vibrate slower, yet the circumstance of the balance-weights *f*, *f*, being bent inward, and brought nearer the centre of oscillation, the balance will of course move faster, and compensate for that enlargement caused by the increase of temperature

On the contrary, if cold increases, for the above reason the brass slip will contract, bending the ends of the bar upwards, and causing the weights *f*, *f*, to diverge, so that though the balance becomes contracted, yet the weights move in a larger circle, and of course the whole compensation-balance oscillates slower.

This must be a very delicate instrument, but its advantages over the present compensation-balance, which is likewise composed of brass and steel united together, do not strike us.

Inrolled, March, 1821.

To ANDREW TIMBRELL, *of Old South-Sea House, London, for an Improvement in the Rudder and Steerage of a Ship or Vessel.*

THE object of this improvement will be best understood by the Patentee's own remarks,—who says, "experience has convinced every nautical man of the danger and inconvenience attending the labour at the wheel, in consequence of the sea striking with violence into the vacuum between the stern-post and the rudder; this danger increases with the velocity of the ship, and during her rapid progress rushes with such weight and power into the chambers, and against the weather-angle of the rudder, as to shake the whole stern-frame, and render the steering of the ship in boisterous weather most laborious and dangerous. This improvement which traverses on the stern-post, acts as a minor helm, gives additional effect to the power of the rudder by the space of the vacuum it covers, and permits the water to pass smoothly from the ship's bottom along the sides of the rudder, without noise, agitation or counteraction; thus reducing the manual labour at the wheel equal to the power of one man, and giving such ease and facility to the steering of the ship, as to render the short iron tiller perfectly secure in all weathers.

The improvement consists of a flap, or minor rudder, traversing with the rudder, and attached by pentles and braces to the stern-post; which flap covers the vacancy around the posts behind the rudder, or between the rudder and stern-post. This vacancy or space in a vessel of 1200 tons burthen, is about 23 feet high, and 18 inches by 12 or 14 inches broad, into which vacuity, when the helm is nearly a-weather, the water rushes with such

force in passing off from the ship's bottom, as to impede her progress and to cause her steering difficult. In case of stern-way, the flap, or minor-rudder, is turned back against the stern-post out of action. On the under part of the stern-post, a piece of copper is fixed to prevent ropes getting between it and the rudder; and it is recommended that the edges of the rudder be cut off, or rounded down to light water mark, to break the eddy otherwise occasioned by its passage through the water.

It is further stated, that by these appendages, the velocity of the ship will be augmented in proportion to her ratio in passing through the water, inasmuch as the effect of that force and counteracting power created by the column of water rushing between the stern-post and rudder (equal in weight to several tons in larger vessels) is prevented, and is applied to her velocity, increasing her average progress equal to one knot per hour, thus giving great facility to her sailing, safety, and comfort; and thereby promoting that desideratum so essential to the superiority of our navy and commercial shipping.

Inrolled, May, 1821.

To JAMES WHITE, *of Manchester, for certain new Machinery adapted to Preparing and Spinning Wool, Cotton, and other Fibrous Substances, and uniting several threads into one; and also certain Combinations of the said new Machinery, with other Machines already known and in use.*

THE chief process employed in the preparation of cotton and other short filaments, previous to the opera-

Plate VIII.

White's Preparing & Spinning Machinery.

Fig. 1.

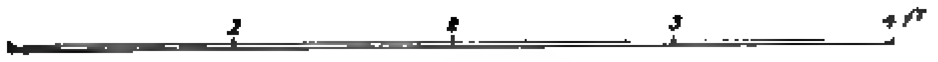
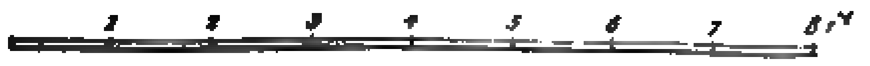


Fig. 3.



S Porter sc

tions of carding and spinning, is that of either batting or scutching the material, so as to separate, in the first instance, the fibres from each other, and to divest them in some measure of the foreign substances with which they are found mixed in the bale. The operation of batting (performed mostly by hand, though sometimes by machinery) is more favourable to the fibre than the process of scutching, but the latter has greatly the advantage in point of expedition. To embrace the advantages of both these methods, the Patentee has invented that part of the following machinery which constitutes the improvement in preparing the filament previous to spinning it into thread.

Plate VIII. fig. 1, is a representation of a frame containing the batting apparatus, in which *a*, is a plate or bar carrying the pivots of four cog-wheels; this bar is carried round vertically by the shaft *b*, upon which it is fixed, the shaft being made to revolve by means of a band-wheel upon the shaft, the band leading from any first movement; *c*, *c*, are arms having, at their extremities, sticks or batting rods to beat the rough material, and separate its fibres; *d*, is a fixed spur-wheel (the shaft *b* passing through it); *e*, *e*, are two cog-wheels carried round by the bar *a*, and working into the fixed spur-wheel, (being of exactly half its diameter and number of teeth) which causes the cog-wheels to run round on their axles. These take into two other cog-wheels *f*, *f*, of the same diameter and number of teeth as *e*, *e*, which are hence turned round in an opposite direction. To the axles of the wheels *f*, *f*, the arms *c*, *c*, are fixed; and as the centre shaft turns, the extremities of these arms carrying the batting-rods, are made to describe a long ellipsis within the frame, and strike almost perpendicularly upon the material intended to be

operated upon, which is spread upon an endless net, or grating, carried by the rollers *g*, *g*, *g*. The net or grating is supplied with the material at *h*, which being spread out by hand, is progressively but slowly brought forward by means of a band connecting one of the rollers to the first mover. The material or fibrous substance having been thus operated upon by the very rapid motion of the batting-sticks, is delivered out of the machine in a soft and partially cleansed state, to which it is the object of this machine to reduce it.

The second part of the improved machinery, viz. that adapted for drawing the carded wool, cotton, and other fibrous substances, is intended to take up the process after the breaking and carding is complete. The engine now about to be described is seen at Plate VIII. fig. 2. The carded material being supplied by a cloth, or ribband, from a receiving cylinder, round which it is wrapped several times as usual.

This machine is intended to work in immediate connection with a narrow carding-engine, and therefore has only one spindle. There would, however, be many spindles to a rolling or spinning-frame intended to work alone or with a wider carding-engine.

The carded cotton, or other material, is conducted from the main furnishing cylinder, as above described, on to the roller *a*, from which it proceeds down so as to pass between the first pair of drawing-rollers.

The action of the machinery is as follows. The moving-power, either of steam, water, or otherwise, or from the carding-engine, is communicated by a band to the pulley *b*, upon the axle of which is a bevel cog-wheel, taking into a bevel-pinion upon the main shaft *c*; (these are shewn by dots to prevent confusion). At the top of this shaft there is a spur-wheel taking into the cog-wheel

upon the axle of the bevel-wheels *d*; this cog-wheel also takes into another upon the axle of *e*, and, by these means, the two sets of bevel-wheels *d* and *e*, are made to turn contrary ways; *f*, *f*, are several pairs of drawing-rollers, between which the filament passes; upon the ends of the axles of these drawing-rollers there are pinions working upon the bevel-wheels *d* and *e*, the lower of which pinions, as they run round a larger circumference than the upper ones, cause the rollers to which they respectively belong to revolve more rapidly; and by the respective pairs of rollers increasing in velocity, as they are placed farther from the part where the filament is first received, so the fibres become more and more separated: that is, the filament becomes finer and finer as it passes through the whole system of drawing-rollers.

Now, the peculiarity of this machine consists not in the axles of the drawing-rollers being placed in the same position successively one under the other, but every following pair of rollers turns at right angles to the rollers immediately above; by which means the fibre of the material is more uniformly drawn out; so that, instead of the filament being continually thinned and widened by its passage through each successive pair of rollers, it becomes collected and flattened in a new direction by every pair of rollers between which it passes. Such appears to be the efficacy of this peculiar process, that ten or twelve pairs of rollers may be used in succession without any danger of breaking or dissipating the filament, and a much finer roving can be produced by this process than by any other.

Having described the drawing process, we proceed to the spinning, which is performed by the other parts of the same machine, as shewn in fig. 2. Motion being given to the shaft *c*, as before described, the cog-wheel *g*, fixed upon the shaft *c*, is made to revolve, which, by

taking into the pinion upon the shaft of the spindle *h*, puts both the flyer *i*, and bobbin *j*, in action. It is to be observed that "this motion must be given by means of geering wheels, as the system requires a certain quantity of twist for a given length of roving." In order that the roving may be wound in a spiral form equally upon the bobbin *j*, the bobbin is made to ascend and descend upon the spindle *h*, by the action of the lever *k*, which rises and falls by means of a rope passing from it over the two pulleys to the vibrating bar *l*. The vibration of this bar is produced by a roller at its upper extremity, working against the heart-roller *m*. This heart-roller is turned by the endless screw *n*, which is put in motion by a cog-wheel upon the axle *e*. Hence as the heart-roller *m* goes round, the bar *l* vibrates, and by means of the rope, draws the lever *k* forward, which raises the bobbin and enables the flyer to deliver the spires of roving in a uniform coil round the bobbin as it rises.

The lever *k*, is supported by a carriage *o*, which is intended to slide up and down in the frame *p*. The catch *g*, takes into a rack upon the side of the frame and depresses the carriage one tooth at every vibration of the lever *k*. To prevent the roving from being unequally strained, there is a drag upon the lever *k*, under the bobbin, formed by a rising piece which stands diagonally across the upper edge of the lever, and acts by friction on the under side of the bobbin nearer to the spindle when the bobbin is low, and farther from the spindle when the bobbin is high; so that the greater effect of the drag operates upon the bobbin when the roving is winding upon the larger part of the cone. The weight of the full bobbin is prevented from increasing the drag by the inclined position of the frame *p*, which projects out

at bottom: for when the lever and the bobbin is at the bottom of the frame, the rising piece upon the lever *k*, before mentioned, act close up to the spindle and produces very little friction; whereas when the bobbin is high, the rising pieces act farther from the spindle and nearer to the periphery of the bobbin, which causes a greater degree of friction, and thus, by its ascent and descent, coinciding with the gradual filling of the bobbin, the roving is at no time subject to an unequal strain or the possibility of breaking.

The third part of the invention consists in the construction of a machine, in which the individual action of the last described apparatus, as connected with a single carding-machine, is multiplied: that is, in which roving and spinning is carried on upon an extended scale, or with a considerable number of drawing-rollers, and also spindles. This machine the inventor calls an *eagle*: the power of this engine being greater, and its properties superior to that of the *throstle*, the principal engine at present used for continued spinning, he cannot, he presumes, designate it by a better inferior appellation.

This eagle is a combination of the above improved apparatus with the drawing system already known, and used both in mules and throstles. The particular part of the mechanism here claimed is the mode of giving motion to the spindles, by which *three* important effects are stated to be produced: first, a uniformity of twist which cannot be obtained by band-movements; secondly, a considerable saving of power compared to the mode of driving the common throstle or water-frame; thirdly, a swiftness of motion, under which bands would lose all claim to precision.

Plate VIII. fig. 3, exhibits an elevation of this machine, the frame being composed of pillars and cross-

bars. The main shaft *a*, passing up the middle, receives motion from a first mover by a band-wheel *b*. There are two rings, *c* and *d*, which are intended to support a number of spindles with their flyers, (perhaps about sixty, though only one is shewn to avoid confusion). These spindles are put in motion by the toothed wheel *e*, upon the main shaft which geers into the pinions upon the spindle. Above these will be seen the beam *f*, which supports the drawing-roller, similar to those of good throstles, or mules, but changed in position from a straight line to that of a polygon of six or eight sides. These drawing-rollers *g*, *g*, *g*, *g*, of which there are three rows one behind the other, receive their motions from each other by means of the bevel cog-wheels, at the ends of the axles of the front roller. Those set round one half of the machine, are driven by a spur-wheel on the shaft *h*, and those on the other half, by the spur-wheel on the shaft *i*. Above the beam *f*, is fixed the kreel-ring *j*, on which (by means of pins) the rovings *k*, *k*, are placed within cops, or on bobbins, and thence when soft rovings are used, are carried over the smooth conducting ring *l*, down to the drawing-roller *g*.

The bobbins upon the kreel do not simply give off the roving as the rollers draw it, but when over twisted roving is drawn from the bobbin by means of a fly, as shewn at *k*, 1, and an upper conducting-ring, shewn by dots, then the cops themselves are made to turn backwards by the pulleys under them, and a band or chain carried round, which is driven by the pulley-wheels upon the shafts *h* and *i*. Thus the cops are turned just so much as will undo the over-twist, and leave the roving as soft as if it had not been over-twisted. It is proposed, instead of putting the bottoms of rovings on pins for the purpose of drawing, to detach them from the

bobbin and put them upside down into a kind of skeleton, as shewn in section at *k* 2; which is also to be untwisted by the before-mentioned means; and, on being thus softened, will then readily draw out of the hollow cone with less resistance than it would experience by the flyer before-mentioned.

The principle of placing the drawing-rollers obliquely to each other is capable of variation and modification; and it is further proposed to form the rollers as cones, by which a diagonal extension of the filament is produced and reversed by every successive pair of cones or roller through which it is passed.

It is further stated that another important application of this machine, or eagle, may be made to the producing of thread, or sewing-cotton. The usual operation performed on a machine made like a throstle, consists in bringing several threads together from the kreel, and drawing them through water by means of a proper set of rollers, which deliver them united to the spindle, where they are corded and copped in the same manner as in the process of spinning. But an imperfection arises from these machines being hitherto worked by bands, which slip and produce unequal twisting. In this engine, however, which is worked by geering, the spindles have constantly the same motion and produce the same twist; so that by placing the water-boxes upon the roller-beam, as they are placed on common thread machines, and taking two or more threads from the kreel through the water, or over any substance wetted, and leading them thence between two rollers to the spindles, this eagle becomes a complete thread-machine, having the property of uniting and cording fibrous substances already spun with ease, swiftness, and greater precision than can be effected by the use of bands.

Inrolled, January, 1821.

To HENRY BOTFIELD THOMASON, *of Birmingham, Warwickshire, for certain improvements in the making and manufacturing Cutlery:* viz. *that species of Cutlery called or styled table knives, dessert knives, fruit knives, pocket knives, scissors, razors, and surgical instruments.*

THESE improvements consist in the adaptation of steel edges to the blades of gold and silver knives, and other edge tools, as expressed in the title of the patent. These steel edges are to be attached to the other metal, of whatever quality it may be, of which the knife, &c. is made, by means of solder, in the ordinary mode of effecting that process. After the edge of steel is thus attached to the gold, silver, or other metal, of which the substance of the knife is formed, the same is to be ground, polished, and tempered by immersion in cold water, or oil, after being heated. The process being complete, the other parts of the knife are then wrought and ornamented by the engraver or chaser, as usual, which forms no part of the invention.

Inrolled, August, 1820.

To JAMES HARVIE, *late of Berbice, but now of Glasgow, for an Invention, communicated to him by a person residing abroad, of improvements in the construction of machines, commonly called Ginning Machines, and which are employed in separating Cotton Wool from the Seeds.*

THIS invention consists in the application of shifting brushes to the back of the rollers usually employed in gin-

ning machines; by means of which brushes, the cotton, on passing through the rollers, in the operation of separating it from the seed, is prevented from being carried round the roller; a circumstance to which it has been hitherto subject, very much to the injury of its colour and fabric.

These brushes are to be constructed by means of pieces of black birch wood or any other hard wood, the dimensions of which are directed to be half an inch thick, two inches and a quarter broad, and of such a length as will exactly fit into the space between the pinchers, whereby the rollers of the ginning machine, to which they are to be applied, are held together. In the edge of the piece of wood, above described, a groove is to be cut, and the bristles introduced and secured, by the same means as are usually employed in the ordinary process of brushmaking.

This mode of shifting the brushes, for the purpose of adjustment, is by means of two mortices in the slips of wood, through which screws pass that hold the brushes to the gin. So that the bristles may be brought in immediate contact with the roller, and at any time, if worn away, may be reinstated and adjusted to the rollers, by means of the screws.

Inrolled, September, 1820.

To WILLIAM BATE, Esq. *of Peterborough, Northamptonshire, for certain improvements in preparing Hemp, Flax, and other fibrous substances, for spinning.*

THE improvement here suggested, consists in the construction of a machine composed of a multiplicity of

wheels, pinions, and rollers, which are all turned by one toothed-wheel, receiving its motion from any first mover, as a steam-engine, water-wheel, &c. The hemp, flax, or other fibrous substance intended to be prepared (that is, broken, scraped, and cleansed from the boom or woody parts) is to be passed through this machine one or more times, in order, in the first instance, to break its hard external coat; and, afterwards, to subject it to the operation of raking, by means of scutchers, by which the previously broken boom is scraped off.

At the top of the machine there are two indented rollers working into each other, between which the rough hemp or flax is first introduced, and, by passing through, becomes crimped and broken previous to the scutching process. From these crimping or breaking rollers, the filament descends between two conducting rollers down to the first of the presenting rollers, (as they are termed) of which there are several; and between every two of them is a small guide roller, for the purpose of keeping the filament tightly distended. A large and also a small drum-wheel carry a number of scutchers or scrapers, placed lengthwise round the drums, in the same manner as the rake-bars of hay-making machines. The large drum-wheel being made to revolve rapidly, causes the scutchers to scrape the filament on one side, as it comes down; the lesser drum-wheel, placed lower in the machine, scrapes it on the other side; it being presumed that a great portion of the boom has been displaced by the scutchers above.

By these means the broken boom is entirely removed from the fibres, by the time that the flax and hemp have passed through the machine. The presenting rollers are placed one under the other, and increase in diameter as they approach the bottom; by which means the filament,

in its descent, is stretched in length, and the separation of the fibres considerably assisted.

Immediately under the breaking rollers there are two thin plates, bent as troughs, in order to catch the pieces of broken boom, and prevent their falling among the wheels, pinions, and rollers, at the lower part of the machine, an opening being left between the troughs for the passage of the flax down to the guide rollers. These troughs are inclined and bent on one side, into the form of a spout, and, by cranks and connecting rods, are agitated when the rollers are in motion, by which means the broken boom is conducted away into a receiving vessel below.

The patentee does not confine himself to the precise disposition of the rollers, as shewn in his specification; and, of course, proposes to unite many of these machines together. We do not, however, see any advantage in this complicated machine, or in this mode of preparing flax and hemp, over others which have been heretofore in practice; and for this reason we decline giving a more particular description and representation of the machinery.

Inrolled, October, 1820.

To WILLIAM TAYLOR, *of Wednesbury, Staffordshire, for his invention of an improved Furnace for the smelting of Iron and other ores.*

THIS improvement consists in constructing the hearth of a furnace in such a manner, that the blast may be conveyed into it through *several apertures in the same side of the furnace;* by which means it is conceived that the blast will be distributed more equally through the

whole of the fire, and with greater effect, than if conducted through *one* aperture, as has hitherto been the practice.

There is no precise scale of dimensions or proportions which need be adhered to; the simple contrivance is to convey the wind by blow-pipes from the bellows through several apertures, or *twyer-holes*, at once to the fire, by which, it is stated, the smelting of iron and other ores will be more easily effected.

Inrolled, April, 1821.

Original Communications.

Spots on the Sun.

To the Editor of the London Journal of Arts and Sciences.

Sir,

To hazard an opinion as to the precise time in which the sun revolves upon his axis, would be presumption in so young an observer as myself; but to give a series of representations of the spots on the sun, as they have appeared, and which have for some few years engaged my attention, may be acceptable to the readers of your valuable Journal of Arts. "We may state facts, where it would be hazardous to deliver opinion."

From the year 1660, these phenomena have attracted the attention of astronomers and the philosophical world; and it seems to be the decided opinion of most astronomers, and, indeed, of all those whom I have read concerning the solar spots, that the rotation of the sun

with nebulæ, made their appearance on the eastern edge of the sun to the south; see fig. 3. These spots became more visible, and augmented with some smaller ones on the next day; and on the 3rd appeared as fig. 4. On the 4th the spots were a little altered, and three other smaller ones appeared toward the centre of the sun's disc, see fig. 5. On the 5th one of the last mentioned little spots was not to be seen, and the eastern group had become somewhat elongated. On the 7th they appeared as fig. 6.

The next day the group had become more compact; but on the 9th again elongated, with a new spot on the eastern part of the disc. On the 10th the sun appeared as fig. 7. On the 11th the smaller spots had arranged themselves horizontally, and advanced to within half the distance which they were from the group the day before. On the 12th they were considerably to the south-ward, as seen at fig. 8. On the 13th the group had nearly reached the western edge of the sun's disc, and on the next day were not to be seen at all. Now two other small spots were become visible, as fig. 9, which were seen also on the 15th; and, probably, the same again on the 17th, though somewhat changed in position, as well as four spots in the south, see fig. 10.

In looking at the sun this day, I plainly perceived either a hollow or protuberance on the upper part of the disc, surrounding the two small spots nearer the edge of the disc; this appearance I have many times seen before, but never so plain as on this morning.

On the 18th these spots had altered their position, as fig. 11, and still more so on the 19th, see fig. 12. On the 23d the group was near the western edge; and on the 27th, which was the next clear day, only one very small spot was to be seen. On the 28th, however, another

group became visible, as fig. 13; but on the 1st of November the face of the sun was without a spot, and continued so until the 6th. At that time a few small spots were seen toward the south-east, see fig. 14; and on the 7th the same spots were seen somewhat advanced and more compact. On the 9th two spots only, and very small, near the centre of the sun, appeared; after that time all observations were suspended, in consequence of the dense state of the atmosphere, for the space of nine days.

The 18th was a fine clear day, and having been prevented from observing the sun for more than a week, I was carefully noticing it about eleven o'clock in the forenoon, and found nine spots on the disc, four of which were very large, and each appeared surrounded with a very considerable nebula. Being pleased with the unusual appearance, I continued to observe them for about half an hour, that I might delineate them very accurately; and, having finished the drawing, I by chance turned again to the upper spot, when, to my great astonishment, I found that it had broken, and become a number of small ones, which I counted, and found the whole to amount to thirty-one, being an increase of twenty-two spots within the short space of half an hour, see fig. 15.

On the 20th some of these spots had diminished, some increased, and some of them split in two, as fig. 16, the whole having advanced to the westward. On the 21st, their appearance was so much altered (see fig. 17) as scarcely to allow of identifying any of the spots seen the day before. On the 22nd the spots had returned nearly to their appearance as on the 20th; and on the 23d, several new spots, with nebulæ, came on at the south-east of the disc, while the former approached the western edge, see fig. 18. On the 24th their appearance had but

little varied, except that the principal group was upon the verge of the western extremity; and on the 25th had disappeared, leaving the disc of the sun as fig. 19.

On the 27th, the group, seen before in the east, had passed the central parts of the disc, and a very large spot, surrounded with a nebula, now appeared in the east, as fig. 20.

December the 1st, the sun exhibited the appearance of fig. 21. On the 3rd, the single spot in the west had disappeared, but, on the 4th, three other new spots, with a nebula, were seen to the northward, in addition to the three former. On the 8th, three small spots were seen on the eastern edge toward the south, and one on the western toward the north; but were not visible on the 9th. Now several spots, as fig. 22, appeared, which had advanced on the 10th and 11th, with little alteration in their appearance. On the 13th the disc exhibited the spots as fig. 23, the smaller of which did not appear. On the 14th, the largest spot had separated into two, and on the 18th appeared as fig. 24. On the 20th, a single spot, with a large nebula, made its appearance as fig. 25, which had diminished in size, but with the addition of two small spots on the 22nd. On the 23rd, it had elongated with four small specks on the eastern side; and on the 24th had become broken and augmented, assuming the appearance of fig. 26. On the 25th, the number of small spots were thirteen, beside the large one in the midst of a nebula, which, on the 26th appeared as fig. 27; and on the 29th had become reduced in number, as fig. 28. On the 30th, they were on the verge of the disc, with one new spot of no very considerable size in the east, which, on the 31st, had approached toward the middle, and was then the only one seen.

Dr. Hook, in his *Opera post.* draws these further con-

clusions:—1st. That these bodies are either opaque, and so hinder the sun's light from passing through them, or else are incombustible and dark bodies, which will afford no light at all for a certain time, and do, as it were, quench and deaden that part of the sun where they rise.

2nd. There appear, in some parts of the sun's face, also nebulæ or clouds; in some others faculæ or blazes, which give a brighter light than the other parts of his body. The spots are subject to increase and decrease, having sometimes covered a part of the sun larger than all Europe, and sometimes larger than the whole surface of the earth.

3rd. The motions of these spots are always from east to west, and they appear to move in a straight line about the beginning of June and December; when the earth is in that part of the plane of the ecliptic which cuts the plane of the sun's equator.

At other times the line of their motion is incurvated and bent into an ellipsis, which is greatest when the earth happens to be in those parts of the ecliptic, which are the extreme limits of it, compared to the plane of the sun's equinoctial. And this, also, is twice a year; viz. in the middle between the nodes, both planes passing the centre of the sun, that is, about the beginning of March and September. Whence Dr. H. deduces, by undeniable demonstration, that the sun is of a globular figure, and that it moves on its own axis from east to west; as also that the axis of his turbinated motion remains fixed, and is always directed towards the same point in the heavens, as the earth's axis is found to be; as also the axis of Jupiter and Saturn, as far as can be discovered by the spots and satellites of the former, and ring of the latter planets.

4th. He also observes, that there is a kind of torrid

zone, or certain space or breadth on each side the sun's equator toward the poles, in which these maculæ, nebulæ, and faculæ do most appear. Whereas beyond those limits, or in the temperate zones (as we should say with regard to our earth) they appear but seldom, and never towards the polar parts.

I hope soon to be allowed to engage another page of your valuable work, with some further and curious extracts from more experienced observers, and perhaps to dare, by enquiry, to intrude an opinion of my own.

I am, Sir,

Yours,

CHARLES H. ADAMS.

Lower Edmonton.

Mr. Varley on a Defect in Lenses.

To the Editor of the London Journal of Arts and Sciences.

SIR,

Having discovered a defect in glass, which has hitherto escaped the notice of Opticians, (as mentioned in your first vol. page 49) I shall now beg leave to give a more particular account of it. All glass is subject to certain defects, which opticians call seeds and threads, or veins, which render a great portion of it unfit for optical purposes; threads or veins are not discoverable until the glass is ground and polished, and many pieces are found to be unfit for use after they have been so wrought. An object seen through a piece of glass having a vein appears distorted, and straight lines appear crooked or bent into sharp angles, rendering vision indistinct. Notwithstanding

these defects frequently occur, yet pieces of glass can be selected that appear free from them.

The defect, however, which I am about to mention, and which I call *lateral* veins, is so common to all glass that I have never seen any perfectly free from it; they are so numerous that 15 and sometimes 20 may be seen in a piece of glass not more than one quarter of an inch thick, particularly in crown and flint glass, in both of which they are more numerous than in plate glass. I have a piece of plate ¾ of an inch thick, in which I do not find more than four of those veins, but it is a rare case. They appear to me to be caused by the glass arranging itself into strata when it is cooling, and that those strata, being of different densities, produce the defect under consideration.

In order to render these lateral veins visible, and form an estimate of the injury they occasion to vision, it will be necessary to take a piece of glass of about ½ an inch thick and one inch in width, grind and polish it flat on both sides, and it will represent a piece of plate glass. Then grind and polish two of its opposite edges, and upon viewing a straight line in the direction A, B, (see plate IX. fig. 2,) supposing it free from veins (commonly so called) the line will appear straight and distinct. Afterwards view the same line through the glass edgewise, or in the direction C, D, when those *lateral* veins will become visible, and the line will appear indented. When these strata are parallel and of equal thickness they do not appear to do much mischief; but they are frequently not parallel nor of equal thickness; they then act as so many prisms. Let it now be supposed that this flat piece of glass is wrought into a lens, a plano-convex for instance, one of its plain sides remaining as before, and the other side wrought into a curve, as *a*, *b*; now it is

evident this curve will cut those strata or veins obliquely; particularly towards the extremity of the curve, and, therefore, though they were parallel before, they will now become prisms in these places where the curve intersects them. I have no doubt that it is owing to one or both of these causes that pieces of glass, which have been selected as clear and good, have deceived the expectations of the optician, and proved not so distinct as had been expected, particularly for nice observations, such as the well defining of close and small double stars, where the utmost distinctness is requisite; yet the same might perform well for larger objects, such as the planets, or a land view.

As there cannot be an effect without a cause, and in several instances, as no other cause could be found, it may be concluded as probable that these veins were the real causes of the defect. The late Lord Stanhope had occasion for some cylindrical pieces of glass, which were to be wrought spherically convex at each end, and finding rods from the glasshouse so full of veins that they would not answer his purpose, he required me to cut off some slips from the thick piece of plate mentioned above, and after rounding them, to work them spherically at the ends. The veins, however, though fewer than in any other piece I ever saw, yet rendered them so indistinct that they could not be used for the purpose intended. Prismatic lenses are much desired for the eye-pieces of telescopes, when employed for viewing objects of high altitudes, but owing to those veins it is impossible to have them good: for though the light may enter in the direction A, B, its direction is changed to C, D, before its emergence, and therefore rendered indistinct.

Small spherules have been in much request for microscopes but very few are found good: for when the threads or small fragments of glass are melted by the flame of a

lamp or candle, to give them a spherical figure, these veins curl up in such a manner as to render them, for the most part, useless, and always inferior to a well wrought lens, where care is taken that the axis of the lens is in the direction A, B, of the glass out of which it is made; and if this is not attended to, the lenses will prove indistinct, excepting by accident it happens that the glass is taken in the right direction. I have called the above mentioned defect *veins* for want of a better term, and because their effects are so similar to what opticians call veins; I have further called them lateral veins, because they can only be seen laterally or sideways in the glass; whereas the veins that are noticed by opticians can only be seen when we look through it. Any one may verify the existence of such veins by the means already mentioned; and whoever makes the experiment upon crown or flint glass, will find them so numerous, that he will be astonished that the object glasses of achromatic telescopes, which are composed of two or more lenses, made of those sorts of glass, should perform so well as they generally do.

As to the real cause, I say nothing; that must be left to the glass-makers' to determine. It is my intention, only to point out what has hitherto escaped observation.

Finding it impossible to procure glass perfectly fit for all optical purposes, I tried other substances. Crystals, which possess a double refractive property, I knew could not answer the purpose, and therefore procured some of the finest pebble, such as is used for spectacles, which is not suspected to refract double; but having wrought some of this into lenses of a short radius, I found by its refractive properties a single line appearing double, in every instance in which it was tried.

Query. Can this be a good material for spectacle lenses? I think not.

I then wrought some fine paste (as it is called) in which no defect could be seen, when in the lump. The late Mr. Parker, of Fleet-street, considered it to be the purest glass that could be made. Lord Stanhope purchased a considerable quantity of it, some of which was wrought by the opticians, and some by myself, with the utmost care; but no one article made of it ever proved good for optical purposes: all exhibited indistinctness. I observed that, however bright it appeared in the lump, yet when ground and polished, it always assumed a milky whiteness, and became indistinct. If I am rightly informed as to the mode of making this paste, we need not wonder at its effects: for I am given to understand, that after it is made into glass, it is broken to pieces and ground, and after being sifted through a fine sieve, it is then melted over again, and the pot suffered to cool; when cold, it is cut or broken into such pieces as best suit the manufacturer's purpose. If this be the case, must not the veins above mentioned be broken into small fragments; and instead of being in somewhat regular strata, become mixed in all directions in the general mass, and acting as minute prisms, and being of different degrees of hardness, may we not, from these circumstances, account for all the bad effects stated above? I do not know any substance natural or artificial that is not in strata, whether in a solid or fluid state; or which does not soon become so by repose. This was the case with a fluid object glass for an achromatic telescope, which when first made proved far superior to all others; insomuch, that one of 17 inches in length bore as great an aperture, magnifying power, light and distinctness, as others of the usual construction of 42 inches in length; but in a short time

all this distinctness was lost; the fluid arranged itself in strata, and a star or planet or any bright object appeared like a number of ribbands of different colours. Whether it is owing to the common attraction of matter, chemical affinity, the attraction of aggregation, or all those causes conjoined, or some unknown cause, must be left to future experiments and experimenters to determine.

I am, Sir, &c.

SAMUEL VARLEY.

Newman-street.

To the Editor of the London Journal of Arts.

SIR,

IF the following improvement on Mr. Bullock's Ball-valve, (see No. VIII. of this Journal) should appear to you of sufficient importance to merit a place in your journal of mechanical inventions, I should feel obliged by its insertion.

In the form of the valve or cock of the service-pipe, I do not propose to make any alteration from that of Mr. B., my object is to allow the full current of the water until the cistern is full, and then to shut it off instantly. For this purpose, I propose to make the arm projecting from the cock-rod forked, so that it may receive the pivots of an axle, on which the end of the float-rod shall turn; *a*, fig. 3, Plate IX. is the rod or arm of the float, from which a projecting piece, *b*, rises; *c*, is a wheel with a ratchet turning loosely upon the axle of the float, and fixed to this wheel is an arm or lever, *d*, with a knob at its end, acting against the falling valve, *e*, (shewn by dots;)

f, is a catch taking into the ratchet, and *g*, a pin or arm on the side of the ratchet-wheel.

The cistern being empty, the float hangs down, and by its arm, *a*, pressing upon the pin, *g*, the wheel, *c*, is turned round, and there held by the catch; the arm, or lever, *d*, at the same time, keeping up the valve, *e*, while the cistern is filling. In this situation of the valve, the water is allowed to flow through the mouth of the cock, without any contraction of the aperture. But as the water rises in the cistern, the ball or float rises also, its arm leaving the pin, *g*, and when the float is near the top of the cistern, the projecting piece, *b*, lifts the catch, *f*, out of the ratchet, which being no longer held, allows the force of the water acting upon the top of the valve, to bring it down, and close the water-way instantly.

By this improvement, the stream is continued full until the level of the water has become raised to near the top of the cistern, and then its course is immediately terminated by the falling valve.

I remain, Sir,

Yours, &c.

J. S. S.

H. Bosworth, Northampton,
April, 1821.

New South Shetland.

Several Merchants' Vessels have lately arrived from these newly discovered shores, all of which were said to be well laden with seal-skins and oil. The accounts, however, which the Captains think proper to give of the country, are not worthy of implicit confidence, as private

interest seems to prompt them to mislead. That the shores of New South Shetland are extremely productive of fish, the cargoes of skins and blubber which have arrived, sufficiently evince; and the statements of the crews however much to be mistrusted, are certainly corroborative of the generally received opinion, viz. that New South Shetland is a part of an Antarctic Continent.

It is stated, that the interior of the land has been traversed for some considerable distance, and all accounts agree as to its wide extent. The shores are said to be extremely dangerous, and many vessels, (particularly Americans) we understand, have been lost here during fogs, which are very prevalent.

We are favoured with the perusal of a private letter from New South Shetland, written by Lieut. G. F. Airey, R. N. dated on board the *George*, *New Plymouth*, *3d January*, 1821, but in what latitude or longitude this place is situate, the account does not state.

The writer says, "When I left home, I did not think an opportunity would offer of writing an account of New South Shetland, but more ships are here than was expected, when we left England. A London cutter sails to-morrow, whose Captain has kindly offered to forward this to Liverpool.

"We arrived after a short passage of ten weeks, at the Falkland Islands, in hopes of killing oxen in abundance, but were much disappointed. They were too wild to allow any one to come near them; so that we were obliged to put up with about a hundred and forty wild geese, and one wild boar. We left Falkland, on the 25th of November, and made this detestable place, on the 1st of December.

"We have not seen the moonlight or a star since we

came here, and scarcely know the difference between noon and night, for clouds and fog. The sun is only two hours down out of the twenty-four; (this being the summer season,) but snow never leaves this place, even at midsummer.

"At our first making the land, we came in a boat to look for a harbour among the rocks, (as it is nothing but rocks,) and in going out again to the ship, it came on a thick fog, and we lost ourselves, and very nearly for ever. We got among the breakers, the boat was upset, rolled over three times, and dashed us against the rocks. Our escape was most miraculous and providential, which all the men in the boat, (eight beside myself,) acknowledged when we got safe on shore, and spontaneously returned thanks to God upon our knees for his kind mercy towards us; so you may judge how we were, when a sailor thinks of his Maker.

"The weather is as cold as you have it at Christmas. The seals are not so plentiful as was represented at Liverpool, we must therefore put up with a moderate quantity; we have now about nine thousand seal skins, and I am still in hopes of obtaining about two thousand weekly.

"Walking one day upon a mountain, I saw the ribs and head bones of a whale lying in the snow. It is a matter of very great surprise how the animal should get here, I do not apprehend the spot was ever trodden upon by human feet before."

G. F. AIREY.

In the early part of the present month (May,) the above ship, *George*, arrived at Cork with a cargo of eighteen thousand skins, having by a dreadful squall and hurri-

cane, and a succession of bad weather, lost all her anchors, cables, and ground tackle, and for her own safety, was obliged to put to sea, leaving Lieutenant Airey, (the writer of the above) behind in a cutter, who had gone to a Bay to the westward.

The return of Captain Basil Hall, (now engaged upon a survey of New South Shetland,) is shortly expected, and we hope to be able to lay before our readers an early and authentic account of this important discovery.

Novel Inventions.

Snowden's Leaf collecting Machine.

A machine of rather a novel description, has been recently constructed by Mr. Snowden of Oxford-street, for the service of His Majesty, to be employed in the Park and grounds of Hampton Court. Its principal object, is to collect dead leaves from off the lawns, with very great expedition. It moves upon a pair of large wheels, and is drawn by a single horse. The apparatus consists of a large cylindrical tub, about five feet in diameter, and seven feet long, which swings upon an axle, and is open at top in order to receive the leaves as they are collected. The collectors are hollow iron scoops or scrapers, attached to bars extending across the machine from two iron hoops, which work round the cylindrical receiver, and, as they revolve, scrape the ground, collect the leaves together, lift them up, and turn them over into the tub. The collectors or scoops are made of many distinct pieces set in rows, with springs behind each, by which any part of the scraper is enabled

to give way, should it come in contact with a stone, in a manner similar to the rake bars of a hay-making machine. The hoops carrying the scrapers, are lowered and adjusted to meet the ground, by having their pivots supported in a lever attached to the carriage, upon which it is adjusted by means of a circular rack and pinion. The scrapers are carried round as the carriage moves forward, by means of a spur-wheel, upon the nave of one of the carriage wheels which takes into a cog-wheel upon the axis of the scraper frame. This apparatus is designed beside clearing parks and lawns of dead leaves, to remove snow from the walks, to scrape and clean roads, and for several other useful purposes.

Apparatus for Condensing the Vapour from Gas-burners.

Mr. Richardson of Upper East Smithfield, has invented an apparatus, for the purpose of receiving and condensing the vapour emitted from gas-burners, which effectually remedies the inconvenience generally experienced by the smoke and other corrosive exhalations depositing themselves upon goods, particularly in shop windows.

Over the burner, (which branches out as a scroll from a standard pillar,) is suspended a bell-glass or funnel, connected to a bent return pipe. The vapour from the burner rising up into this inverted ball-glass is there collected, and thence passes up through the bent part of the return pipe, where it becomes condensed. The water thus produced, falls down through the standard pillar

into a reservoir below; where a discharge pipe is fixed that conducts the condensation away in any direction which may be most convenient. The gas-pipe rises up through the reservoir, and within the standard pillar, leaving a space around it for the condensed vapour to pass. The branch carrying the burner, is connected to the standard pillar by a joint, which enables both it and the return-pipe, to be moved round horizontally.

Apparatus for Propelling Ships of War.

Captain Burton, of His Majesty's Navy, has invented, an apparatus by which ships of war may be propelled in a calm; and also, by means of the said machinery, to work the ship's pumps,—the operating agents are paddle-wheels. He states that there are three circumstances, in which the application of the machinery about to be described, will be found advantageous; first, in propelling the vessel when she is becalmed, or on a lee shore, by applying the men at the capstans, as the power for working the paddles. Second, in working the chain-pumps, by the application of the men alone to the capstans. Thirdly, in the application of the paddle-wheels, as a power to work the chain pumps, when the ship is under sail, and in a leaky state.

A horizontal shaft of iron reaches across the vessel, and at each end of the shaft on the outside of the ship, is fixed a cast-iron frame. In this frame, are eight mortices to receive iron arms to carry the flat boards or paddles. These arms are fixed into the mortices by keys or otherwise, as may be most convenient for unshipping, and the

extremities of the paddles are braced together by two sets of light rods or stays.

At the lower part of the ship's capstan, is fixed a wheel or rigger, from which passes an endless chain to another capstan and rigger, near the shaft of the paddles; the upper surface of the last mentioned capstan, is formed as a bevel cog-wheel, which works into a bevel pinion upon the shaft of the paddles. By this machinery, when the vessel is becalmed, the power of the men exerted at the capstan, is communicated to the paddle wheels, which being impelled round, rows the vessel forward.

If the men are required to work the pumps, the paddles must be removed, and the geer be unshipped, by sliding the pinion away from the bevel cog-wheel upon the head of the additional capstan; another pinion is then brought into connection with the said bevel cog-wheel, which, by means of rods and cranks, puts the chain-pump in action.

But should, by leaking, more water be admitted than the men at the capstans are able to keep under, the paddle-wheels must be attached as above, and the pinion put into the geer with the bevel cog-wheel; by which means, the pump may be worked by the action of the ship when under sail, by the revolution of the paddle-wheels alone, without the assistance of men at the capstans; or, if the ship's way be not sufficient, the men may also be employed in aid, at the same time the paddle wheels can be readily removed and stowed away; or were the ship in chace, and a calm coming on, the paddle-wheel could be put together, and would be ready for working much sooner than the boats could be got out.

The highest testimonials as to the efficacy of this invention, have been given by Captain Hollis, of the *Ramil-*

lies, and also by Captain Gordon, of the *Active*, on board of which last ship, the apparatus has been employed, very much to the satisfaction of the officers and the Lords Commissioners of the Admiralty. The Society of Arts last session, presented Captain Burton their silver vulcan medal, as a reward for his invention.

Substitute for Leghorn Straw Plait.

A Bonnet sent from America, has been lately exhibited in London, formed of a material which had not before been applied to the purpose of such manufacture. It is a certain species of grass, which, when dried, is platted after the manner of split straw. The bonnet which has been exhibited, had the appearance of Leghorn straw plait, but of a most superior quality and colour; and compared with the price of the best Leghorn straw sold in the shops, the bonnet shewn was considered by the trade to be of about twenty pounds value. As the bonnet in question appears to be only the second which has been made of this material, and by a farmer's daughter in the United States unacquainted with science, we are not informed of the particular species of grass from which it was produced, but, only that the same grass grows in abundance, mixed with other grasses in the meadows of her father's farm.

The discovery of this material, appears to promise very extensive advantage to that part of the peasantry of England, who are engaged in the straw plait manufacture, as the preference lately given to Italian straw plait, and which is still becoming more fashionable, has deprived a vast number of our country women and children of the means of obtaining subsistence. If this grass can

be imported from America, in sufficient quantities; of which we understood there exists no doubt; or if it can be cultivated with success here, there is every probability of the new material superseding both English straw and Leghorn straw, and of shortly becoming an article of very great importance to the country.

The Society of Arts have voted their lesser gold medal twenty guineas, to the young lady, for the specimen, upon condition of her forwarding a stated quantity of the grass fit for the purpose of platting, with a particular description of its genus, and a quantity of the seed for experiments upon its growth in this country.*

Soap as a substitute for Oil in setting Edge-tools upon a Hone.

It has been found, that soap and water rubbed upon a hone as a substitute for oil, is peculiarly effective, and gives a much more smooth and finer edge to a razor, than can be produced by oil. Mr. Pepys is also of opinion, that this will be a better material for setting surgical instruments, than oil.

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* We wish the Society of Arts would turn their attention to several species of *agrostis*, or bent, which grow in our own country; they would find, we think, some of these highly deserving the notice of the British public, as materials for the manufacture of ladies' bonnets, and for other purposes. To one of these species, which grows in abundance on the sand hills near the sea, in various parts of Great Britain, we would particularly direct their attention. Table mats, bee-hives, &c. &c. are already made with it; its toughness and durability render it very superior to straw.

Magnetimeter.

THE magnetimeter is a new instrument invented by W. SCORESBY, Esq. jun., for measuring magnetic attractions and finding the dip of the needle.

This instrument consists of a small table of brass, $4\frac{1}{2}$ inches square, and $3\frac{3}{4}$ inches high, having a plate of brass attached to it by hinges, and moveable by means of a wheel and pinion, through an arch of 250° of a vertical circle. This plate has a small straight groove running from end to end, for the purpose of receiving bars of metal, the polarity of which is to be determined. These bars are readily fixed to the plate, by being slipped through a circular aperture in the end of a spring, which perforating the moveable plate, and acting downward, firmly embraces any substance laid along the groove. The angular position of the moveable plate is marked by a graduated circle, screwed upon the side of the table. On the brass table is placed a moveable flat plate of brass, divided into rhumbs and degrees, and furnished with a magnetic needle, with an agate cap traversing on a brass or steel point. The needle can be changed according to the nature of the circumstances; a very light and strongly magnetized one being used in delicate experiments. The compass or plate carrying the needle being moveable, its distance from the bar resting on the moveable plate, can be varied at pleasure. The centre of the hinges is one-tenth of an inch above the level of the table, the magnetized needle stands at the same elevation; and the bars in use being one-fourth of an inch in diameter, are sunk in the groove of the moveable plate to such a depth, that their axis, or centre, precisely corresponds with the centre of the hinges; hence the middle of the extremity of

each bar is at the same elevation, and at the same distance from the needle in every position of the moveable limb. To give firmness to the instrument in making experiments, the table is fixed by the feet to a mass of lead, of seven or eight pounds weight. By means of this plate of lead, which has a screw at each corner, the whole apparatus is readily put into a horizontal position.

The following are the chief results of Mr. Scoresby's experiments with this Magnetimeter.

1. Iron bars become magnetical by position, excepting when placed in the plane of the magnetic equator; the upper end, as regards the position of the magnetic equator, becoming a south pole, and the lower extremity, a north pole.

2. No attraction or repulsion appears between a magnetized needle and iron-bars; the latter being free from permanent magnetism, whenever the iron is in the plane of the magnetic equator; consequently, by measuring the angle of no-attraction, in a bar placed north and south, we discover the magnetic dip.

3. Before a magnet can attract iron, that is totally free from both permanent magnetism and that of position, it infuses into the iron a magnetism of contrary polarity to that of the attracting pole.

4. A bar of soft iron, held in any position, except in the plane of the magnetic equator, may be rendered magnetical by a blow with a hammer, or other hard substance; in such cases, the magnetism of position seems to be fixed in it, so as to give it a permanent polarity.

5. An iron-bar with permanent polarity, when placed any where in the plane of the magnetic equator, may be deprived of its magnetism by a blow.

6. Iron is rendered magnetical, if scoured or filed, bent or twisted, when in the position of the magnetic

axis, or near this position, the upper end becoming a south pole; but the magnetism is destroyed by the same means, if the bar be held in the plane of the magnetic equator.

7. Iron heated to redness, and quenched in water, in a vertical position, becomes magnetic; the upper end gaining south polarity, and the lower end north.

8. Hot iron receives more magnetism of position, than the same when cold.

9. A bar-magnet, if hammered when in a vertical position, or in the position of the magnetic axis, has its power increased, if the south pole be upward, and loses some of its magnetism, if the north end be upward.

10. A bar of soft-steel, without magnetic virtue, has magnetism of position fixed in it by hammering it, when in a vertical position; and loses its magnetism by being struck when in the plane of the magnetic equator.

11. An electrical discharge, made to pass through a bar of iron, devoid of magnetism, when nearly in the position of the magnetic axis, renders the bar magnetic, the upper end becoming a south pole; but the discharge does not produce any polarity, if the iron be placed in the plane of the magnetic equator. The effects appear to be the same, whether the discharge be made on the lower or upper end of the bar, or whether it be passed longitudinally, or transversely through the iron.

12. A bar of iron possessing some magnetism, has its polarity diminished, destroyed, or inverted, if an electric discharge be passed through it, when it is nearly in the position of the magnetic axis, provided the south pole of the bar be downward, while its magnetism is weakened or destroyed, if it receive the shock, when in the plane of the magnetic equator.

13. Iron is rendered magnetical, if a stream of the electric fluid be passed through it, when it is in a position

nearly corresponding with that of the magnetic axis; but no effect is produced, when the iron is in the plane of the magnetic equator.

Machine for walking upon the Water.

THIS machine, invented by Mr. Kent of Glasgow, consists of large balls, as floats, made of tin about fifteen or eighteen inches diameter, rather flatter at the top, one of which is placed in front, at about ten feet distance from the other two, which are behind at about four or five feet asunder: forming an isoceles-triangle. From each of the floats proceeds a curved bar of iron tending to a centre; these are kept from yielding by means of a block or frame joining them together, and supporting the saddle upon which the operator sits. The machine is directed by means of a lever attached to the front float, which the operator holds in his hand, somewhat in the same manner as the lever used to direct the pedestrian hobby-horse. The whole is impelled by means of paddles attached to his feet, having a joint, so that when he moves his leg back the paddle lays hold of the water, but in drawing the leg forward it runs along the surface, and does not impede the progress of the machine.

Polytechnic and Scientific Intelligence.

GREAT BRITAIN.

Royal Academy.

THE Annual Exhibition of Pictures at this Academy, now open, affords a various display of talent; but we are

still sorry to observe, that *Portraits* seem rather on the increase, there being upwards of six hundred of these and busts, &c. among 1165 paintings, sculptures, &c. of which the whole exhibition consists. We have most certainly, no objection to a painting, or a sculpture of the human face divine, the index frequently to all that is amiable, lovely, intelligent, and great, but why many of such faces, which nobody knows except the painter and a private circle, should be held up for public inspection at the Royal Academy, is difficult to divine.

Painting and sculpture are unquestionably beautiful, amusing, and instructive imitative arts. Perhaps, however, few painters except those of the highest order in their art, and of very superior minds coolly calculate the *moral* effect which their works may, probably, produce. Many pictures are painted *to order*: that is, a picture of a given size, on a given subject, and at a certain price. Under such circumstances, the chief object of the painter will be to execute the order, which he has received, so as to please the person by whom he is to be paid. But some of such pictures although paid for handsomely, ought notwithstanding, never to have been painted;—no, although prompted by the offer of a douceur of three thousand guineas!

Some of the paintings in the present exhibition, appear to be paintings to order, and ought not to have been painted. A few are immoral; but the greater part of these ordered paintings, are fortunately merely puerile.

Notwithstanding, a painter may plead an *order* for a picture, if the subject be such as is injurious to the morals of the community, we doubt very much the propriety of his complying with the order; but we have no doubt of the indecorum of exposing at the Royal Academy such

a picture. If bad or depraved taste will have such pictures, they ought to be confined to the walls of those who ordered them, and not be exhibited to corrupt the taste of the British public. Regard for our artists, prevents our being more explicit on this subject; we hope our hints will not be thrown away. It should be remembered, that an unprincipled painter like an unprincipled writer, is a public nuisance.

Having made these preliminary observations, we shall now proceed to comment upon a few of the individual subjects; premising, that although we have visited the Academy twice during the current month, the eagerness of the public to inspect this national collection of paintings is so great, and the crowds so inconvenient, that it has been with much difficulty, we could find opportunity to judge properly of many of the pictures: a proof at any rate of the increased taste for these elegant and attractive exhibitions, and greatly flattering to our artists.

No. 7, *Portrait of the Marquis of Bute*, by A. Raeburn, is a good picture. So is No. 14, of the *Earl of Longford*, by Cregan. No. 21, *Portrait of a Lady*, by M. A. Shee, does credit to the painter.

No. 22, *The burial of Edward the Fifth, and his brother the Duke of York, who were murdered in the Tower, June 9th*, 1483, *by order of Richard* III., by Northcote, cannot be contemplated without horror: it is an historical picture of very considerable interest.

No. 36, *Portrait of J. C. Curwen*, Esq. M. P. by J. J. Halls, offers us the strongly defined lineaments of a veteran and consistent senator, whom England will never cease to consider among the most prominent worthies of the age.

No. 58, *Portrait of Earl Grey*, by J. JACKSON, does the artist credit; we wish, No. 69, *Portrait of the Marquis of Londonderry*, by the President, Sir T. LAWRENCE, had been less gaudy.

No. 78, *Portrait of Dr. Uwins*, by T. UWINS, is strongly characteristic of the gravity and mind of the Physician.

No. 95, *Portrait of Sir M. W. Ridley*, by JACKSON, is good; so is No. 106, *Portraits of Mrs. H. Baring, and Children*, by Sir T. LAWRENCE.

The mind of *D. Ricardo, Esq. M. P.* is well pourtrayed in No. 116, by T. PHILLIPS.

No. 121, *Portrait of Mr. Alderman Wood*, by LONSDALE, although a good picture, is not so happy a likeness as has been occasionally given of this gentleman.

No. 131, *Guess my Name*, by WILKIE, is an excellent picture; the whole group is alive!

No. 171, *Portrait of Sir Humphry Davy, Bart. President of the Royal Society, &c.* by Sir T. LAWRENCE, is well executed; but there appears to be wanting a certain sort of gravity with which we almost involuntarily invest the President of this learned body; such associations, are however, perhaps not strictly necessary.

Tintern Abbey, has been painted in almost every light and shade; in No. 207, we have it, when

"The yellow moon-light sleeps on all the hills."

By W. LEWIS: in this novelty of position, much of imagination is necessarily awakened.

On No. 213, *Scene from Nature, Mid-day*, by R. REINAGLE, we can scarcely dwell too much. No one can contemplate this painting, without being per-

suaded that the fine arts are still progressive in this country.

No. 229, *Satan borne back to his Chariot, after having been wounded by the Archangel Michael,* is a great effort for a Lady, Mrs. ANSLEY, particularly when the difficulty of the personification of the chief personage in the drama is taken into the account.

No. 243, *Sea in the Bay of Biscay: Ships scudding,* by W. DANIELL. Those who desire to feel what the great deep is, that wonderful and great element, which teaches

Eternity, Eternity, and Power,

may here find food for their gratification.

In No. 272, *View in Penge-wood, looking towards Beckenham,* C. BAYLEY, has given many strokes full of nature and truth.

No. 309, *Scene of a Wood-side,* by G. ARNOLD.

"Far in the windings of a vale,
"Fast by a sheltering wood,
"The safe retreat of health and peace,
"A humble cottage stood."

Persons whose tastes attract them to the town, to the noise, the bustle, and the heartlessness of London and other great cities, may exclaim with Dr. Johnson when walking in Greenwich Park, that these scenes are not equal to Fleet-street; but the genuine lover of nature, virtue, and truth will recognize the abode of all the finer and the purer feelings of our nature in this *Scene on a Wood-side;* and if fate should shut him out from a residence amid such scenes, his consolation will not be small,

when he reflects that such scenes are indeed to be found upon the earth, and that we have ARNOLDS to paint them for us.

As we looked on No. 310, *London from Greenwich*, by G. SAMUEL, we could not avoid lamenting the misdirected taste of the literary leviathan of the last age, alluded to in the last paragraph, who could so strangely prefer Fleet-street to this spot. It reminds us of an opinion of a critic of the present age, who has asserted, that the finest view of the world is on Blackfriar's Bridge. But what philosopher or poet, will join him in the opinion?

No. 327, *Jealousy: a sketch*, by H. FUSELI, has the fire and animation of one of the most terrible of the human passions.

No. 328, *A festive Scene of Roman Peasants, at the bath of Diana, on the Tower of the Lake of Albano: Castel Gandolfo on the summit*, J. FREARSON, is a lively and agreeable picture.

No. 329, The *Hard Word*, by J. L. AGASSE, is well done. Poor boy!

No. 339, *Landscape, Noon*, by J, CONSTABLE, is a pleasing picture.

Of the Portraits, No. 319, *Sir E. Swinburne, Bart.* by J. A. SCHETHY; of No. 334, *Hugh Leicester. Esq.* by Sir W. BEECHY, and of the *Right Hon. the Lord Mayor*, by W. HOBDAY, it will be sufficient to say that they do the painters credit.

No. 345, *The Musk Ox brought from the North Pole by Captain Parry*, by H. C. SLOUS, is an interesting animal and well finished.

No. 365, *The Cobler of King's Road, Gray's Inn*, by W. M'CALL, is one of those pictures of truth and nature

which never fails to please. We have been anxiously looking for other pieces from the pencil of this rising artist. One of the *Duke of Wellington*, which we saw some time since by special favour, ought to have been in the present exhibition: how is this?

No. 384, Portrait of —— *Hanson, Esq.* by HALLS, is a most excellent likeness.

Of No. 385, *Le Malade Imaginaire*, by F. Y. HURLSTONE, the subject is very ill chosen. How much soever satirists and others, who delight in saying or in writing smart things, may take a pleasure in ridiculing persons afflicted with those diseases commonly termed *nervous*, they should be told, that there is no excuse for inhumanity; the diseases of the imagination are often the most acute and painful of all diseases; and are, besides, frequently accompanied with considerable corporeal derangement, not apparent to, or not understood by, the pert, the conceited, and the superficial.

No. 404, *View from Norwood*, looking towards Dulwich, Surrey, by P. NASMYTH, will do the artist no discredit.

No. 416, *Portrait of G. Webb Hall, Esq.; in the back ground Sneed Park and the River Avon, King's Weston, and the Bristol Channel*, by J. LONSDALE, is one of the best executed pictures in the present exhibition.

No. 425, *Poor Relations*, by STEPHANOFF, is an affecting and pathetic picture, the story of which is well told. We would not be the proud and scowling lady for all the wealth of the Indies.

No. 472, *Landscape, Composition from Campbell's Gertrude of Wyoming*, by C. VARLEY. Another by the same, No. 558, *An old Fount and a Farm House at*

Pepper Hill, Staffordshire, belonging to Sir George Piggott, Bart. may also be mentioned here. They are both, we understand, done in varnish; they are both good pictures, and evince that this artist is improving.

No. 545, *A Family Picture*, by T. STEWARDSON, forms an interesting group, to which, we dare say the painter has done ample justice.

No. 559, *North Country Mails at the Peacock, Islington*, by J. POLLARD, excites strongly the attention of the visitors at the Academy. The coaches, horses, drivers, passengers, &c. &c. are in good taste and well executed; the only drawback in the picture is the indifferent finishing of the houses in the street.

No. 574, *A Trophy and Temple leading to a Sepulchral Cavern*, by J. GANDY, will not detract from the fame which this artist has heretofore deservedly obtained.

No. 575, *The Family of W. N. Rothschild, Esq.* Consul-General to His Austrian Majesty at the British Court, by W. HOBDAY, is a fine picture, evincing the varied talents of the artist with much effect.

No. 576, *Varieties of Roses in an Etruscan Vase, drawn at Lee's Nursery*, by Mrs. POPE, evinces at once the great and varied beauty of the genus *Rosa*, and the lady's talents in this line of painting: they are both charming.

Of No. 648, *Celosia Cristata, or Cockscomb*, drawn from nature for the Horticultural Society, by Mrs. POPE, we can scarcely speak too highly; it is a splendid trophy of nature and of art.

No. 1063, *Perspective View for a suite of Public Baths proposed to be erected in the Regent's Park*, by J. ELMES. Whatever opinion may be formed of this perspective, Mr. Elmes deserves well of his country in

exciting the public attention to the subject of Public Bathing. We cannot, however, avoid thinking that the neighbourhood of the Regent's Park is by no means calculated for public baths. It appears to us, that the water for such baths ought either to be a running stream, or at least, that it should be completely changed once in twenty-four hours; we are not aware how such change can be effected in the proposed site.

We all know that the more usual modes of bathing in this metropolis, are, either by the floating baths stationed in the Thames, by hiring a boat, or, which is the most common, to bathe in the New River: here in the summer, in the neighbourhood of Islington and Newington-Green great numbers plunge daily into the aqueduct, to the great annoyance of the passengers on its banks, and to the disgrace of the New River Company, who permit such ablutions in a stream from which such a large portion of the metropolis obtains that fluid so useful, nay so essential to life. Surely if such indecencies cannot be prevented, it is deserving the attention of the first metropolis in the world to provide a canal or stream where no decency would be shocked, and where a moderate depth may secure against accidents from drowning, and where also a constant change of the water may be effected, so as to make this exercise and mode of ablution, not only pleasant but salubrious and safe.* The south side of the metropolis offers by far the greatest convenience for baths, where a constant and daily change of water may be effected from the Thames: the baths may be surrounded with a wall, but they should be exposed to

* Family Cyclopædia.

the open air. There may be retiring houses for dressing and undressing.

Sculpture proceeds, we hope *pari passu*, with her sister art.

No. 1086, *Celadon and Amelia; Group in marble*, by C. Rossi. We are sorry to be obliged to observe relative to this group, well executed as it unquestionably is, that there is a manifest deficiency of costume. The story is British, and one also of the last century; why then is Celadon pourtrayed in a state of nudity? It may suit the sculptor's anatomical ideas, but evinces a great inattention to the poetical story of Thomson, whence it is professed to be drawn. In other respects it is a chaste production, and does the artist great credit.

Ought No. 1089, to have been exhibited at the Royal Academy? We think not.

Chantrey, as usual, excels in his busts, eight of which dignify the present exhibition; viz. No. 1126, the *Hon. Walter Charteris*;—No. 1128, *Thomas Phillips, R. A.*;—No. 1131, *Of a Gentleman*;—No. 1132, The *Marquis of Londonderry*;—No. 1133, *Sir Walter Scott, Bart.*;—No. 1134, *W. Wordsworth, Esq.*;—No. 1136, *The Bishop of Rochester*;—No. 1139, *Sir A. S. Hammond, Bart.* These are all excellent. Of the effect of one of them on ourselves we may be permitted to speak. We know the venerable prelate, the Bishop of Rochester well; he has now been totally blind for some years; it is four since we ourselves have seen him; nor did we know that his bust was in the exhibition, till, without the assistance of the catalogue, we at once recognised him in the cheerful and striking lineaments which the artist has so admirably pourtrayed!

No. 1155, *Benevolence;* part of a Monument now

erecting in memory of the late Archibald Seton, Esq. a member of the Supreme Council at Calcutta, by J. Bacon.

Aware of the severe and arduous labours of our artists, we never willingly censure any of their works. But excellence can only be attained by a rigid attention to propriety and fitness; and trusting that our observations may lead to that excellence, we feel it our duty to observe on the statue just mentioned, that nothing can be more trite, or stale, and now indeed, from our better knowledge of natural history, unnatural tha nthe adjunct of the pelioan feeding its young from its bleeding breast. It is now well known that some of the species of the pelican, the *Pelicanus Onochrotalus*, or White Pelican in particular, has a pouch in front of the neck, which is used for the purpose of a crop to contain food for itself and for its young. Surely, therefore, it is time such puerilities were abandoned. In other respects this work is well executed.

We have now taken a rapid review of the *fifty-third* exhibition of the Royal Academy, and although we can by no means think it so good as some which have preceded it, there is, nevertheless, sufficient talent in it to convince us that the fine arts are not retrograding in this country; we make this observation with most unfeigned pleasure.

As a lively conclusion to our critique, we present our readers with a sketchg outline of some portions of the exhibition of 1818, from a poem entitled the Dandies; it has never been before published.

"I go oft to the Royal Academy, Dick,
The portraits of Dandies are there pretty thick;
'Tis a lounge I much like—as one passes review,
How pleasant the lisping soft pout "ah, how do?"
The Ladies too like it—and bright-eyed desire
Peeps oft from their bonnets to see and admire.
Here Hebes all beauty in elegance chaste;
There Nature and art in the highest of taste;
Here an angel of earth with a light flowing vest,
There heroes all fire our attention arrest;
I confess to you, Dick, I'm in painting not read,
That I know not which pleas'd most, the *living* or *dead*.
Here was "*Wellington's Duke*," in his dress Waterloo,
Well painted by LAWRENCE, but sombre in hue;
And the lesson of Turner's in "Waterloo field,"
Will ever deep sorrow to sentiment yield;
But I don't like such scenes of destruction and blood,
They debase much the mind with bad morals a flood."

"That *sculpture* improves, Dick, there can't be a doubt;
Our sculptors at last have, most wondrous! found out
That to study the ancients is step sure to fame:
They studied of Nature—we must do the same.
I'm an odd one you know, and I have my own taste,
And wish with high mind the proud art to be grac'd;
Thus I think that the "bust of the late Mr. Horner"
By CHANTREY, done well, laughs to scorn every scorner;
And that mild man of peace deserves more from the nation
Than all our great heroes of depopulation.
I say this in front of great *Malthus* verbose,
And all his fine periods about what, the Lord knows.
Having said a wise saying, as I suppose this,
To close now my letter will not be amiss."

Exhibition of Engravings by Living British Artists, No. 9, Soho Square.

We announced this exhibition in our last. Before proceeding to a notice of the subjects, upwards of 400, which are here offered to the inspection of the public, we think it may be useful, once for all, to observe, that in our notice of works of art we studiously, and as much as possible, avoid the use of all *technical* terms; being persuaded that they are too often introduced by the critic, either to conceal the poverty of his own conceptions; as dust to prevent the reader from seeing distinctly; or, perhaps the most usual motive, to impress upon the uninitiated in terms of art, the superior adroitness and abilities of the writer: for it too often, unfortunately, happens that a few of these delectable terms which

> "Amaze the unlearn'd, and make the learned smile,"

are supposed to involve a mystic something too sacred for vulgar apprehension. We despise such arts; and in the preceding article have endeavoured, and in the present article shall endeavour to approve and to censure in a language which is understood by all. It is high time for us to descend into the arena of common sense and intelligible writing.

If painting be a noble art, and it most certainly is so, it is nevertheless a very limited one. A good picture, rich in all its shades of colouring, and impressive from the well-chosen nature of its subject, can only affect those who are fortunate enough to behold it, and more especially those who possess it, or who have frequent opportunities of studying it: for, unquestionably, every *good* picture may become a subject of interesting study.

The high price too, which good pictures necessarily bear, limits very much their utility. To remedy this defect, the art of ENGRAVING opens a wide, a useful, and an extensive field. And, although the colouring of the painter be absent, we still find that engraving, by multiplying at a cheap rate, and to almost an unlimited extent, copies of both paintings and drawings, offers an excellent succedaneum for the painter's art. It can, therefore, be scarcely spoken of too highly, or encouraged too much.

An exhibition like the present, got up as it appears to have been, in haste, and to meet the season for such a display, is not so select as a more mature deliberation might have made it; but it is, nevertheless, one with which the lovers of Engraving will not fail to be gratified. And we doubt not, when our artists shall perceive more fully the utility of such a collection, that they will provide more ample and valuable materials to adorn it.

With many of the subjects here exhibited the public are already familiar.

No. 2, *Mrs. Siddons*, painted by Sir T. Lawrence, engraved by W. Say; No. 3, *Earl Fitzwilliam*, painted by W. Owen, engraved by S. W. Reynolds, and No. 5, The *Right Hon. Nicholas Vansittart*, Chancellor of the Exchequer, painted by W. Owen, engraved by W. Ward, do the artists great credit.

No. 7, *Prison Room in Beauchamp Tower, London*, delineated by Nash, engraved by Hobson, is, in our judgment, one of the best works that was ever executed. From this room Lady Jane Grey was taken to be beheaded, Feb. 11, 1554. The various inscriptions scratched on the walls, the peculiar introduction of the light, the floor, the empty nakedness of the room, and other asso-

ciations, render it at once a lively and striking, yet a solemn picture.

The limits to which we are confined prevents us even from naming a great number of well executed works, and which richly deserve the public attention in this collection. Perhaps, however, the best we can do, both for our readers, the artists, and the public, is merely to mention those which we think more especially deserving attention.

No. 15, *Arena of the Coliseum*, Major Cockburn, del. engraved by J. C. Allen.

Vo. 16, *The Tomb* of Henry the Fifth's Chapel in Westminster Abbey, J. P. Neale, del.; engraved by W. R. Smith.

No. 21, *The Benevolent Cottagers*, A. W. Calcott, del.; engraved by J. Scott.

No. 25, The late Right Hon. W. Pitt, J. Hopner, del.; engraved by T. Bragg.

No. 36, *Sir Thomas Ackland*, Bart. R. Owen, pinxt; engraved by S. W. Reynolds.

No. 50, *Dartmouth, Devonshire, and Entrance to Fowey Harbour, Cornwall;* J. M. W. Turner, del.; engraved by W. B. Cooke.

No. 43, *Prisoner of Chillon*, from Lord Byron; H. Corbould, del.; engraved by G. Corbould.

No. 45, *Kemble Family*, Scene from Henry VIII.; G. H. Harlow, pinxt.; engraved by G. Clint.

No. 61, *His Royal Highness the Duke of Kent;* Sir W. Beechy, pinxt.; engraved by C. Warren. His Royal Highness the Duke of Sussex; G. H. Harlow, pinxt; engraved by C. Warren. The late Duke of Northumberland; T. Phillips, pinxt.; engraved by C. Warren.

No. 65, *Brightling Observatory*, Rose Hill Park,

Sussex, the Seat of John Fuller, Esq.; J. M. W. Turner, del.; engraved by W. B. Cooke.

No. 66, *Richmond, Yorkshire;* J. M. W. Turner, del.; engraved by W. R. Smith.

No. 79, *The Bonnet Vert;* Teniers, pinxt.; engraved by Cooper.

No. 114, *Lambton Hall,* the Seat of J. G. Lambton, Esq. M. P.; J. Glover, pinxt.; engraved by John Pye.

No. 122, *The Charge to Peter,* from the Cartoons of Raphael, in the collection at Hampton Court Palace; T. Holloway, del.; engraved by R. Slann, and T. S. Webb.

No. 160, *The Rev. Samuel Crowther;* R. R. Reinagle, pinxt.; engraved by J. S. Agar.

No. 248, *Gerard Douw,* in the collection of the Marquis of Stafford; G. Douw, pinxt.; engraved by J. Mitan.

No. 357, *The Death of Ananias,* from the Cartoons of Raphael; T. Holloway and J. Holloway, jun. del.; engraved by T. Holloway, R. Slann, and T. S. Webb.

No. 364, *H. R. H. Prince Leopold,* of Saxe Cobourg; G. Dawe, pinxt.; engraved by H. Dawe.

No. 365, *H. R. H. the Duchess of Kent;* G. Dawe, pinxt.; engraved by T. Woolnoth.

No. 369, *Mucruss Abbey, Ireland;* G. Gabrielli, del.; engraved by S. Middiman.

No. 388, *Salisbury Cathedral, Wiltshire;* J. Coney, del.; engraved by J. Coney.

Although our own inclinations prompt us to a more extensive notice of this collection, we must forbear. There are also some other *Exhibitions of the Fine Arts* in this metropolis to which we would gladly call the public attention, but for the present we must also forbear; at some future opportunity we may perhaps notice Mr. Haydon's

picture of *Christ's Agony in the Garden;* Mr. Hofland's picture of *Richmond from Twickenham Park, &c.*; Mr. Glover's *Paintings;* the *Exhibition of the Society of Painting in Water Colours,* and the celebrated *Cartoons of Raphael.* The mere mention of these must for the present suffice.

Society of Arts.

SINCE our last, this Society has amongst various others, voted the following rewards.

To Mr. E. BAKER, of Whitechapel-road, for an improved bullet mould; the silver vulcan medal.

To J. GOODWIN Esq. of Carlton Palace, for a spring cross for horses; the silver vulcan medal.

To Mr. G. WITTY, of Holloway, for a fire escape; ten guineas.

To HENRY EARLE Esq. of George-street, Hanover-square, for a bed for patients under surgical treatment; the large gold medal.

To J. STORY, of Theobald's-road, for a portable oven; the silver vulcan medal.

To Mr. J. PERKINS, of Fleet-street, for an instrument to ascertain the trim of a ship; the gold vulcan medal.

To BENJAMIN ROTCH Esq., of Furnival's-inn, for an Arcograph; the silver vulcan medal.

To Mr. S. LAKE, of Alfred place, Bedford-square, for a double door hinge; the silver vulcan medal.

To Mr. J. ALLAN, of Blewitt's building, for his method of dividing circular arcs; the silver medal.

Royal Society of London.

THE following papers have been read at this Society since our last report.

Mar. 8. On the Length of the Seconds of Pendulums in different Latitudes, by Captain E. SABINE.

Mar. 15. Observations on Naphthaline, a peculiar substance resembling a concrete essential Oil, which is apparently produced during the Decomposition of Coal-Tar by exposure to a Red Heat, by J. KIDD, M.D. Professor of Anatomy at Oxford.

Mar. 21. On the Papyri of Herculaneum, by Sir H. DAVY, Bart. P.R.S.

Mar. 28. On the Aberration of compound Lenses and Object-Glasses, by J. F. W. HERSCHEL, Esq.

An Account of the Skeleton of the Dugong, by Sir E. HOME, Bart.

April 5. On the Separation of Iron from other Metals, by J. F. W. HERSCHEL, Esq.

April 12. On the mean Density of the Earth, by Dr. C. HUTTON.

On the Restoration of a Portion of the Urethra in the Perinæum, by H. EARLE, Esq

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Royal Society of Edinburgh.

THE following Papers have been read at this Society.

1820, Dec. 4. A Notice by Dr. BREWSTER, on the Distribution of Heat in the Arctic Regions.

An Account of the Journey of ALEXANDER SCOTT through Africa, drawn up by Dr. TRAILL.

An Account of the Earthquake which was lately felt at Leadhills, communicated by ALEX. IRVING, Esq.

Dec. 18. A paper, containing Observations on the Geography of Scott's Routes in North Africa, and Observations on the Currents which carried the Montezeuma out of its course, by Major RENNELL.

1821, Jan. 8. On the Native Hydrate of Magnesia, discovered by Dr. HIBBERT in Shetland, by Dr. BREWSTER; and also an Analysis of this Mineral, by Dr. FYFE: It consists, according to Dr. F. of Magnesia...69.75
Water 30.25

100.00

a result which differs only a quarter of a *per cent.* from that of Dr. Bruce of New York.

On certain Fossil Shells, found near Cincinnati, North America, which retained the marks of having been in a soft or pliant condition, by Mr. JAMES FLINT.

Jan. 22. Mr. SCORESBY'S Description of a *Magnetimeter*, for measuring the Dip of the Needle, &c. (See another part of our Journal for a description of this instrument.)

Another paper by Mr. SCORESBY, on some remarkable Atmospherical Reflections and Refractions observed in the Greenland Seas, was also read.

Feb. 5. The first part of his paper on the Temples of Egypt, particularly those of Thebes, by Colonel STRATON.

Feb. 19. On Nosographic Lines for exhibiting to the Eye the Progress of certain Symptoms of Disease, by Dr. ANDREW DUNCAN, Jun.

On the Encroachments of the Sea on the Shores of the Frith of Forth, by HUGH MURRAY, Esq.

A notice respecting the working and polishing of Granite in India, by Dr. KENNEDY.

Mar. 5. On the Current of the Lagullus, by Major RENNEL.

At the same Meeting were laid before the Society, drawings and a description of a twenty-five feet Reflecting Telescope, constructed by Mr. JOHN RAMAGE, of Aberdeen.

This is said to be the largest Reflecting Telescope ever constructed, excepting those by the celebrated Sir W. HERSCHEL. The speculum is 25 feet focal length, and 15 inches in diameter. The method of observing is by the front view; the power is from 500 to 1500; the mechanism by which the observer and the instrument are moved, is so simple and well contrived, that it can be managed and directed to any part of the heavens as readily as a three feet achromatic telescope.

Part 1, of Vol. IX. of the *Transactions of this Society*, has been lately published. It contains the following Papers:—

On the Parallel Roads of Lochaber. By Sir T. D. LAUDER, Bart.

On the Poisonous Fishes of the Caribbee Islands. By WILLIAM FERGUSON, M.D.

Account of a Mineral from Orkney. By T. S. TRAILL, M.D.

Extract from an Inspection Report on the Mud Volcanoes of Trinidad. By WILLIAM FERGUSON, M.D.

Memoir on the Repeating Reflecting Circle. By Major General Sir THOMAS BRISBANE.

Description of a Fossil Tree found in a Quarry at Niteshill. By the Rev. P. BREWSTER.

Account of a non-descript Worm (Ascaris pellucidus) *found in the Eyes of Horses in India*, by ALEXANDER KENNEDY, M.D.; *with a Description of the Animal*, By Capt. T. BROWN.

Memoirs relating to the Naval Tactics of the late John Clerk, Esq. of Eldin, being a Fragment of an intended Account of his Life. By the late JOHN PLAYFAIR, Esq.

On Circular Polarisation, as exhibited in the Optical Structure of the Amethyst, &c. By Dr. BREWSTER.

An Examination of some Questions connected with Games of Chance. By C. BABBAGE, Esq.

On the Radiation of Caloric. By the Rev. T. C. HOLLAND.

Notice respecting a remarkable Shower of Hail which fell in Orkney, on the 24th of July, 1818. By PATRICK NEILL, Esq.

Observations on the Mean Temperature of the Globe. By Dr. BREWSTER.

Method of determining the Latitude from Circum-meridian Observations, taken near Noon. By Major-General Sir THOMAS BRISBANE.

Description of a Vegetable Impression found in the Quarry of Craigleith. By THOMAS ALLAN, Esq.

This beautiful vegetable impression belongs to some unknown order of plants.

Account of the Native Hydrate of Magnesia discovered by Dr. HIBBERT, (see above).

Description of a Magnetimeter, being a new Instrument for measuring Magnetic Attractions, and finding the Dip of the Needle. By W. SCORESBY, Esq. Jun. (see above, and also another part of our Journal.)

Account of the Establishment of a Scientific Prize. By the late ALEXANDER KEITH, Esq.

Inflammability of fixed Oils.

WE are sorry to observe upon this subject, that many of the scientific persons who gave evidence on the late trials, *Severn, King, and Co.* versus *the Insurance Offices*, have almost lost sight of this important chemical question, and engaged in personal attacks and altercations. For the honour of science, we hope to hear no more of such unworthy proceedings.

ing to others. Of the obscurity of specifications in our own language we have constant reason to complain; that obscurity is certainly not less in the French language than in our own.

To Joseph-Etienne-Victor-Gabriel Donat, No. 28, rue des Bons-Enfans, Paris, an addition to his brevet* for fifteen years, for the sudden desiccation of urine, the manipulation of night-soil, and the preparation of the lime employed for the absorption of urine. April 6, 1820.

To François Bourdel, chemist, No. 7, rue Bailleul, Paris, brevet of invention for five years, for the composition of a cosmetic paste called *Pate de Venus.* April 15, 1820.

To Jean-Ambroise Gaudet, tinman, No. 19, rue de la Croix, Paris, brevet of invention for five years, for a coffee-pot with a double filter, to boil without evaporation. April 15, 1820.

To Joseph-Gaston-Jean-Baptiste, Comte de Thiville, Chateau de Prelefort, brevet of invention for fifteen years, for a new system of rolling *(roulage)*, the object of which is to reduce the resistance of the first and second kinds of friction only. April 18, 1820.

To Guillaume Caron, Bressan, brevet of invention for ten years, for a distillatory apparatus. April 20, 1820.

To Pierre Despiau, manufacturer of linen cloths, No. 17, rue de la Bucherie, Paris, brevet of invention for five years, for a machine to manufacture stuffs of all widths. April 25, 1820.

To Messrs. Lefevre and Portail, spinners, at St. Quentin, brevet of invention for five years, for a method of winding, without a crank, the thread upon the spindles *(broches des mulljenuis)*. April 25, 1820.

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* *Brevet* means warrant: we think it, however, better to retain the original word.

To Rene Chedebois, mason, No. 31, rue de Verneuil, Paris, brevet of invention and for perfecting, for five years, new chimney caps *(mitres de cheminée)*. May 4, 1820.

To Antoine-Jean Beauvisage, dyer, No. 8, rue des Marmousets, Paris, brevet of invention for five years, for a method of stiffening woollen cloths, thread, and especially *merino* stuffs. May 4, 1820.

To Silvestre Tombini, No. 4, rue Coquenard, Paris, brevet of invention for fifteen years, for a new sphere to demonstrate the Copernican system. May 4, 1820.

To Messrs. François Lartigue and Joseph Loze, apothecaries, Bourdeaux, brevet of invention for ten years, for the straining, clarification, and concentration of syrup of raw sugar by means of a machine exposed to the naked fire. May 8, 1820.

To William Collins, of Valague, brevet of invention for five years, for a plate to guard from moisture the pan of fire arms. May 8, 1820.

To François Delpont, hatter, No. 52, rue de Grenelle-Saint-Germain, Paris, brevet of invention for five years, for the manufacture of shakos with two felts *(schakos à deux feutres)*. May 8, 1820.

To Jean-Jaques Magendie, in the name of an assurance company for accelerated conveyance by water, No. 15, rue de Richelieu, Paris, brevet of addition and perfecting to the brevet for 15 years, obtained by the Sieur Raimond, August 15, 1819, for a mechanical boat of his invention.

To John Heathcoat, No. 6, rue Vivienne, Paris, brevet for importing and perfecting machines for making lace, called in England *bobbin-net*. May 8, 1820.

To Abraham Poupart, clothier, Sedan, brevet of invention, and for perfecting, for fifteen years, a machine for shearing woollen cloth. May 9, 1820.

To Barthelemi Bacheville, No. 319, rue Saint Denis, Paris, brevet for importing and perfecting, for five years,

a cosmetic water, called *Eau des Odalesques.* May 12, 1820.

To Madame Delacour, No.1, rue de la Monnaie, Paris brevet of invention for five years, for a cosmetic p... called *Topique Labial.* May 12, 1820.

To Aimé-Gabriel Dartigues, manufacturer, No. ... rue de la Chaussée d'Antin, brevet of invention for... teen years, for a machine for shaping and polishing gl... May 13, 1820.

To Isaac Cox Barnet, Consul of the United St... No. 85, rue de Sevre, Paris, brevet of importation fifteen years, for a new printing-press. May 19, 18...

To Edward Humprey, mechanician, No. 21, Voltaire, Paris, an addition to and perfecting of the of importation for ten years obtained by him the April, 1815, for a double pressure steam-engine 19, 1820.

To Nicholas-Hegesippe Manicler, No. 16, rue d... Paris, brevet of invention for fifteen years, for ca... inodorous turf, called *Charbon Manicler.* May

To Jean-François Capron, steward of the Paris, brevet of invention for five years, for a machine, called *Nopac.* June 1, 1820.

To Jean-Baptiste Giraudy de Bouyon, Mar... vet of invention for ten years, for a vegetative ... powder. June 6, 1820.

To Jean-Martin Cazeneuve, No. 77, rue du Temple, Paris, for additions to and p... patent, for fifteen years, obtained the 9th o... for the construction of moveable, inodorous *(Fosses mobiles inodores).* June 17, 1820.

To Messrs. Jacques and Julie Glaxbert Neuve-des-Bons-Enfans, Paris, brevet of five years, for an oil proper for preserving *Fluide de Java.* June 17, 1820.

To Jean-Baptiste Jalabert, mechanician, No. 98, rue du Temple, Paris, brevet of invention and for perfecting, for five years, a chafing-dish with a triple bottom and double current of air, warmed by a cotton wick supplied with spirit; this chafing-dish is called *Aqui-calor.* June 17, 1820.

To Louis-Armand Paulmier, No. 7, rue du Mouton, Paris, brevet of invention for a new kind of lithography, by the process of the scraper. June 22, 1820.

To Jean-Baptiste Saint-Martin, No. 58, rue de la Grande Truanderie, Paris, brevet of invention for five years, for a mechanism, double or simple, called, *neçessaire à jeu.* June 22, 1820.

To Guillaume Merijot, wax-chandler, No. 50, rue Picpus, Paris, brevet of invention for ten years, for the manufacture of wax-candles, called *Bougie optime.* June 22, 1820.

To Messrs. Thomas Pierre, and Jaques Pierre Binet, No. 124, Faub. Poissoniere, Paris, for an addition to and perfecting the brevet of invention for fifteen years, obtained the 17th of February, 1818, for a hydraulic pump. June 26, 1820.

To Messrs. Gensse Duminy, and Co. manufacturers at Amiens, brevet of invention for five years, for the manufacture of a kind of cloth which they call *Clauthse,* and *Clauthse double.* June 26, 1820.

To Charles Jordis, No. 1, rue Lepelletier, Paris, brevet of invention for metal globes to be affixed to the axle-trees of carriages to prevent them from wearing out. June 26, 1820.

To Dominique-Joseph Montague, merchant, No. 6, rue du Faub. Montmartre, Paris, brevet of invention and for perfecting, for five years, a machine for stripping hemp and flax. June 26, 1820.

To Messrs. Baruc Weil, manufacturers of porcelaine,

ments in the construction of boilers, whereby a considerable saving in fuel is effected and smoke rapidly consumed. —Sealed 16th March.—Four months for enrolment.

To Ilario Pellàfinet, of Earl's-court, Middlesex, gentleman, for certain new and improved machinery and methods for breaking, bleaching, preparing, manufacturing and spinning into thread or yarn, flax, hemp, and other productions and substances of the like nature capable of being manufactured into thread or yarn.—Sealed, 27th March.—12 months for enrolment.

To William Southwell, of Gresse-street, Rathbone-place, piano-forte manufacturer, for improvements on cabinet piano-fortes.—Sealed 5th April.—2 months for enrolment.

To James Goodman, of Northampton, saddler, for his improvement on stirrup irons. — Sealed, 5th April.—2 months for enrolment.

To Lieutenant-Colonel Henry Goldfinch, of Hythe, Kent, for his improvement in the formation of horse shoes. —Sealed 5th April.—6 months for enrolment.

To William Annesley, of Belfast, architect, for certain improvements in the construction of ships' boats and other vessels.—Sealed 5th April.—2 months for enrolment.

To William Chapman, of Newcastle upon Tyne, civil engineer, for his method of transferring the ladings of lighters and barges, into ships or vessels, or from ships or vessels into lighters and barges.—Sealed 10th April.—2 months for enrolment.

To James Henry Marsh, of Chenies-street, Tottenham-court-road, for certain improvements on wheeled-carriages.—Sealed 17th April.—2 months for enrolment.

To James Smith, of Hackney, gentleman, for improvements in the machinery employed for shearing or cropping woollen cloth.—Sealed 18th April.—2 months for enrolment.

Scott's, Mechanical Agent.

Saul's, Fruit Gatherer.

Fig 1

Fig 4

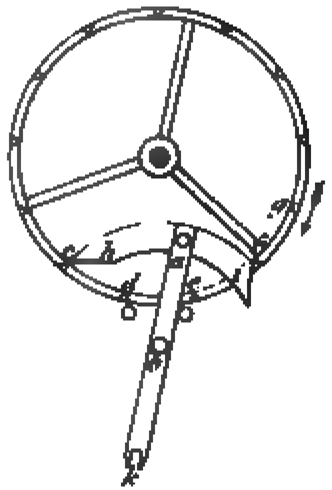


Fig 5

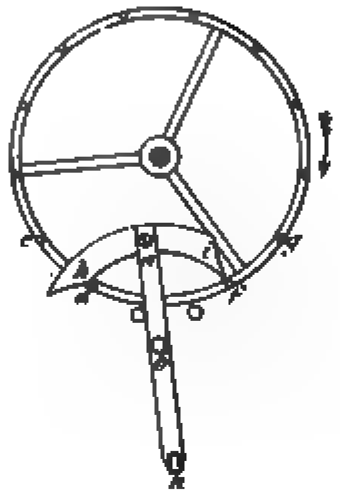


Fig 6

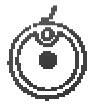


Fig 8

Fig 2

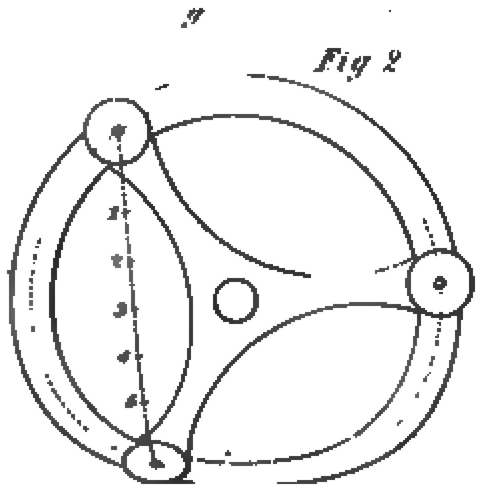
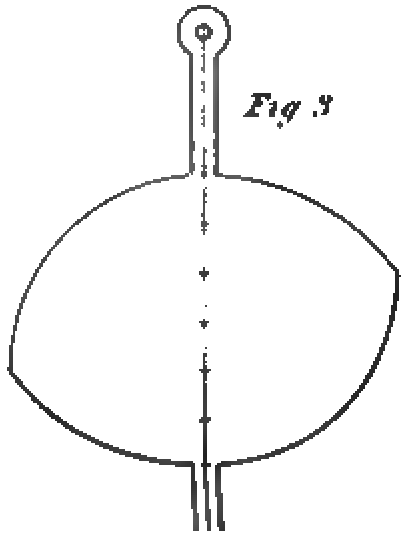


Fig 3



Brunel's, Copying Press.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. X.

Recent Patents.

To JAMES SCOTT, *of Grafton Street, Dublin, for an Invention of a new Method of combining, adjusting, and applying by Machinery, certain of the well-known mechanical powers and modifications thereof, where Power and Velocity are required.*

THE subject of this invention is a contrivance for a first mover of machinery, or as an auxiliary, by which either reciprocating or rotatory motion may be communicated without the assistance of crank or pinion, and with a very small degree of friction. It is described by the inventor as applicable to "the lifting of heavy bodies, propelling of ships, drawing of carriages, pumping, sawing, turning, grinding, &c." and is also calculated for the escapement of a time-piece.

The apparatus, consisting of a wheel intended to revolve, (which carries three anti-friction rollers) and also a vibrating lever, is shewn in Plate XI. Fig. 1: *a, a, a*, is the revolving wheel, turning upon an axle at *b*, the

bearings or supports of the pivots, though not shewn may be imagined; *c*, *c*, *c*, are the three anti-friction rollers mentioned above; *d*, *d*, is the lever vibrating upon a fulcrum at *e*, a part of the lever being formed in the curved figure shewn at *f*, *f*, which curve is called the *motion-converter*. The actuating power either by manual labour, horse, wind, water, steam, or otherwise, is to be applied to the end of the lever at *g*, near which will be seen a guide for the lever to move in upon the side of the frame or carriage, *h*, which is supposed to hold the mechanism; two small rollers are seen at *i*, *i*, to prevent the friction of the lever against the frame, and keep it steady.

The motion-converter operates by its curved edges acting against the anti-friction rollers *c*, *c*, *c*, one after the other; a wide aperture is left in the centre of the motion-converter for the axle or shaft *b*, of the revolving wheel, to pass through; and two stops are placed to determine the angle of vibration to which the lateral action of the lever is limited. There is also a catch, *k*, with a spring attached to the frame, which falls into one of the notches as the wheel *a*, revolves and prevents it from returning.

The action of the motion-converter will be seen by reference to the figure and following description. Supposing the end of the lever *g*, were carried to the left as shewn, then the upper edge of the curved motion-converter, *f* 1. will bear against the anti-friction roller, *c* 1. and, by pressing it, will force the wheel *a*, forward in the direction of the arrow. On the returning stroke of the lever towards the right, the under side of the curved motion-converter, *f* 2. will bear against the anti-friction roller *c* 2. and bring it down as shewn by the dotted lines, which again carries the wheel *a*, forward one-sixth of a revolution in the direction of the arrow. By passing the lever again to the left, the curved edge of the

motion-converter will act against the anti-friction roller, *c* 3. and carry the wheel forward as before. Thus, by the vibratory motion of the lever, at every six strokes, an entire revolution of the wheel *a*, is effected; and its rotation continued as long as the lever is kept in action.

In order to form the motion-converter of proper dimensions, and of the true curve suited to the situation of the anti-friction rollers, and the diameter of the wheel, the following mode may be resorted to. Let the wheel *a*, be of any required size, and, after scribing a concentric circle upon its face, place the axles of the three anti-friction rollers in this circle at equal distances, the diameter of the anti-friction rollers being about one-sixth of the diameter of the wheel within the scribed circle. Now draw a line through the centres of any two of the anti-friction rollers, and, with the distance between the peripheries of these rollers, make a scale divided into six equal parts as fig. 2. Draw a perpendicular line through the middle of the lever *d*, *d*, as fig. 3, and upon this line will be found the centre point for describing, with compasses, the arcs or curved edges of the motion-converter as follows:

Take the whole six parts of the scale for the conjugate diameter or height of the converter; next, take four parts of the scale, and placing one point of the compasses upon the perpendicular line of the fourth division from the top as a centre, describe the upper curve of *f* 1; shift the centre to the second division from the top, and, with the same expanse of the compasses, describe the curve for the lower part of *f* 2. Then take five parts from the scale, and, with that distance, placing the point of the compasses at the first division from the top, describe the lower curve of *f* 1; shift the centre to the fifth division from the top and describe with the same means the upper curve of *f* 2; which curves, intersect-

ing, will give the proper shape and dimensions of the motion-converter suited to the wheel in question.

The mode of applying this principle of action to a time-piece will be seen by reference to figs. 4. and 5. in which the motion-converter must be made of a different form to that above described. In these figures are shewn a wheel with teeth cut as a duplex escapement-wheel, the points of the teeth towards the centre; *a* is the lever carrying the motion-converter and moving upon a fulcrum at *b*, between two banking-pins or stops. The mode of forming this motion-converter is as follows: Place the point of a pair of compasses in the centre of the fulcrum *b*, and describe an arc as seen touching the teeth *c*, and *f*, fig. 4. Then, from the same centre, describe the lesser arc, leaving the motion-converter of a breadth something less than half the space between any two teeth in the wheel; from the point *c*, draw a line connecting the two arcs together, equal in length to two-thirds the distance between two of the teeth: this line forms the inside pallet *h*. Then, from the point *f*, draw another line of the same length, connecting the other ends of the two arcs, which form the outside pallet *i*; but, as the ends of the motion-converter are to be curves, take the radius of the wheel, and with that describe arcs passing through the points, angles at the extremities of the pallets, which will give the proper form of the motion-converter suited to the escapement, and which will move freely between the teeth with equal power on both sides. Fig. 4. shews a tooth *f*, of the wheel as being prepared to act upon the outside pallet *i*; fig. 5. the said tooth as having acted upon the pallet and driven the motion-converter towards the left as far as the banking-pin will permit; another tooth *d*, is now ready to act upon the inside pallet *h*, so as to urge the motion-converter back

again into its situation as fig. 4.; the pallet *i*, having escaped the tooth *f*, which enables the wheel to advance one tooth forward. In this situation the tooth *g*, begins to act upon the outside pallet *i*, which forces the motion-converter again into the situation of fig. 5.; and thus the lever *a*, is kept regularly vibrating.

Fig. 6. shews the kind of roller proposed to be attached to the axis of a balance-wheel, which is recommended as an eligible mode of communicating this escapement with the works. The roller has an upright pin, *j*, to act in the slit at the end of the lever, *k*. The motion-converter is attached under the lever by means of a screw, and is capable of adjustment so as to shift it slightly to either side of the lever, in order that its curves may be acted upon freely by the teeth by which the wheel is caused to revolve, and that the action of the motion-converter may correspond with that of the lever upon the roller.

Inrolled, November, 1820.

To RICHARD WITTY *of Sculcoats in the County of York, for certain Improvements in Pumps of various Constructions for raising and conveying Water and other Liquids; and also methods of applying a certain Principle or certain Principles to Ship's Pumps; and for other useful purposes.*

THE first part of this invention, appears to consist in introducing a siphon into the pump barrel, for the purpose of drawing off water or other liquors from ships, brew-houses, distilleries, &c. when raised by the pumps to a certain level, instead of forcing the fluid entirely up to the top of the barrel, and then suffering it, as usual on ship-board, to run over on the decks; or, as the patentee

expresses it, "instead of letting the water or liquid escape from a common pump at the usual places of delivery, I cause it to descend again in a siphon pipe, to the lowest level at which it can conveniently be delivered; and as this descent is considerable in ships, brew-houses, &c. a considerable saving of labour is effected in working pumps by a descending column of water or liquor counter-balancing as much in length of the rising column in the pump as the height which it descends in the siphon pipe, to the place where it can be delivered." By this contrivance a considerable portion of the labour of pumping the water from below up to the deck is saved.

The water on shipboard, is to be raised in the pump barrel to a little above the level of the water, in which the vessel floats. The mouth of the siphon is introduced into the barrel some distance below the water line; the pipe is thence carried up to the deck, and down the side of the ship, the longest leg of the siphon reaching to the water's edge, consequently, when the pump is working, the siphon draws all the water out of the pump-barrel as low as the level of the water in which the ship swims; so that the men who work the pump are relieved from the weight of all that part of the rising column from the water line to the usual place of delivery.

The second part of the invention is a contrivance for working pumps, by which the physical powers of a man can be more beneficially exerted than in the ordinary mode of pumping. It is here proposed to place the man in a rocking chair, which is to vibrate upon a fulcrum or joint, at the bottom. To the top of the chair back is attached a rope or rod, leading to a bent lever, which raises the pump-rod. The man, being seated in the rocking chair, places his legs in a horizontal position with his feet pressing against the pump-barrel, and his hands

holding a rod also attached to the bent lever. Thus situated he is enabled to rock the chair backwards and forwards, and hence, by means of the rods attached to the bent lever above-mentioned, the pump-rod and bucket are alternately raised and depressed.

There is also a contrivance, for shewing at all times, in the cabin, or elsewhere, the height of water occupying the lower part of the ship. This is effected by means of a float, from which a rod passes up through the decks; the top of this rod rising in front of a graduated scale indicates the height of the water below. Or to the floa rod a small line may be connected and passed over pullies with a plummet suspended in front of a graduated scale as before mentioned.

There does not appear to be sufficient novelty or advantages in the contrivance here proposed to render a more particular description of the plans either necessary or desirable.

Inrolled, April, 1821.

To James Goodman *of Northampton, for his Improvement in Stirrup-irons.*

This improvement consists in the introduction of a cross-bar, bearing a spring within the open bottom of a stirrup-iron for the purpose of supporting a false bottom, which rises and falls according to the motion of the horse, and hence gives considerable ease to the rider. By the use of these improved stirrup-irons, the horse is relieved from any sudden pressure; they are also considered to be preventives against the breaking of the saddle-tree, as the weight of the rider is uniformly carried upon an elastic instead of a solid bearing.

The patentee observes, that those gentlemen who are

prevented from taking the healthful exercise of riding, owing to the greatness of the exertion, will find peculiarly the benefit of this invention, as, even with the roughest trotting horse, the springs will be in continual operation, and hence, reduce that laborious action to which the rider would be otherwise subjected, at the same time giving a lively sensation to the feet, and keeping the blood in active circulation.

Inrolled June, 1821.

To Marc Isambard Brunel *of Chelsea, Middlesex, for his Pocket Copying Press, and also certain Improvements in Copying Presses.*

This invention consists of a light portable apparatus for transferring writing; a section of which is shewn in plate XI. fig. 7.: *a*, is the bottom or bed of the press, proposed to be made of the best gun-metal; *b*, *b*, is a wooden pressing surface, between which and the bed, the written papers intended to be copied, and the blank sheets are introduced. Above the pressing-board is a steel plate spring, *c*, *c*, its ends resting upon ledges; this spring plate is attached to the pressing-board, and supports it by means of the screw *d*; *e*, is a strong steel lever moving upon a fulcrum at *f*, which presses near its centre, upon the knob or screw head *d*; *g*, is the power lever by which the pressure is produced, its joint or fulcrum being at *h*. Under the bottom of the press bed is a box or recess *i*, for the purpose of containing the damping apparatus: these consist of a metal cylinder, round which is rolled several sheets of fine linen, or other suitable material of the same size as the sheets of paper intended to be operated upon, and also a sponge for damping the linen.

The operation of transferring by means of this press is performed as follows:—the paper containing the original writing is to be put into a transferring book, and a blank leaf of paper turned over upon it, then a sheet of the damped linen is laid upon the blank leaf, and upon this a sheet of oiled paper. The book being now closed, and introduced into the press between the bed *a*, and the pressing-board *b*, the hand is to be applied to the lever *g*, which, by descending, forces down the lever *e*, with very considerable power; this action upon the knob *d*, will communicate the force to the pressing-board *b*, *b*, and cause the transferring book to be pinched with sufficient effect to produce an impression of the writing upon the copying paper within.

The dimensions of this apparatus are not given in the specification, it being stated, that its principles are capable of adaptation to various sizes; it may however be presumed, that the length of the press is to be sufficient for the reception of an ordinary sized sheet of writing paper; its breadth is represented as being about one eighth of its length, so that in transferring the whole of a sheet of writing, the above operation is to be several times repeated, the transferring book being advanced by progressive stages, until the whole surface has received the pressure, when the copy will be found to be perfectly communicated to the upper sheet of paper. As no observations are made with respect to the peculiar kind of ink which may be necessary, or the particular quality of paper requisite, it is to be presumed that the same kind of ink and paper heretofore used exclusively for the copying process, is to be, in the present instance, adopted.

The concluding paragraph of the specification runs thus:—"The materials of which the press is made, may be varied at pleasure, and a screw or wedge may be

introduced to communicate motion to the lever *e*. The dimensions also of the press may be adapted to particular situations, but *a light pocket press for transferring writing*, by means of a damped medium, without the necessity of using wetting or drying books, being entirely new, and never before used in these kingdoms to the best of my knowledge and belief, I am desirous to maintain this my exclusive right and privilege to the same; in witness whereof, &c. &c."

Inrolled, June, 1821.

To William Thomas *and* Joseph Lobb, *of Sithney, Cornwall, for a Machine or Instrument for Cutting and Preparing Lay or Lea Ground for Tillage, at much less expense, and in a shorter space of time than is required by the present mode of ploughing, and also for renewing Grass-land, Lay or Lea Ground, with Seeds, without destroying or tearing up the whole surface thereof.*

This machine (which is denominated a *scarifier* or *hash*) consists of a cylinder with many circular cutters, or a number of circular cutters connected together upon one axis, which is intended to pass over the ground for the purpose of scarifying or cutting the surface of grass land perpendicularly to the depth of a few inches, and to any required degree of fineness. By means of this scarifier or hash, the roots of old grass may be effectually destroyed without the labour of ploughing, which is also calculated to enable the farmer to graze the land much longer, previous to breaking it up for wheat or turnip tillage.

The apparatus is proposed to be connected to the

hinder part of an ordinary cart; or the axis of the cylinder or circular cutters may be supported by two iron arms, attached to the axletree with a pair of common carriage wheels. The machine is capable of several modifications as to construction; but the following is set forth in the specification as an eligible form. To the axletree of the wheels (above described) a pair of shafts are attached for the reception of a horse, and from the under part of the axletree the two iron arms or bearers are suspended, which support the axle of the cutters. These arms or bearers are capable of adjustment as to height, by means of nuts and screws, so that the cutters may be made to enter the ground to any required depth. The circular cutters themselves are to be made of metal or any other hard suitable substance, but cast iron cutters, with their edges ground sharp, will, perhaps, under all circumstances, be preferred. These cutters may be made separate, with a hole pierced through the centre of each, and with shoulders on both sides, by which means, instead of one cylindrical cutter, many of these circular cutters may be placed upon the axis, and set at any distance apart, divided by washers, so as to cut the ground to any degree of fineness.

When this machine is used for renewing lawns or grass land, it will then be necessary to fix above the cutters, a box containing grass seed, which box must be perforated with small holes, one hole being exactly over every cutter, so that the seed may fall immediately into the furrow produced by the cutter. In this case it will be necessary to follow the cutters by a roller, which may be connected to the same carriage. There is a latitude taken in this specification, for the purpose of enabling the patentees to vary the form of the cutters, which is indefinitely expressed, and had better have been omitted altogether: for

in the present instance, if the principles of the invention are not confined to the circular revolving cutter, above described, we cannot discover wherein the novelty of the invention consists, or how it can be said to differ in principle from scarifiers, with various formed cutters, heretofore used.

Inrolled, July, 1821.

To JAMES HENRY MARSH, *of Chenies Street, Tottenham Court Road, for certain Improvements on Wheeled Carriages.*

THESE improvements consist of two parts; first, in the form of the interior of the nave-box of the wheel, and secondly, in the mode of attaching the pannels of the carriage to the frame-work. It is proposed, as an improvement, to make the interior of the box triangular, square or polygonal, instead of cylindrical, as heretofore, the object of which is to prevent friction. By the nave-box being of any of these forms, it is considered that so small a part of its surface will come in contact with the axle, that the wheel will revolve much more freely and with less friction than in the present cylindrical boxes, where the axle and box are nearly in contact with each other all round.

The patentee does not confine himself precisely to any of the regular forms, but proposes, under some circumstances, to make the interior angles of the box with blunted or rounded corners; or to use cylindrical boxes with several ribs extending lengthways, so as to reduce the surface of contact and to leave interstices for the reception of the grease, or other anti-attrition matter.

The improvements in the construction of the carriage body are these: instead of boarding the roof or pannelling

up the back and upper quarters as usual, it is proposed to leave them open or in ribs, and to close the spaces with shutters, doors, or flaps, with rebates on their edges. These flaps or shutters, are attached to the frame-work on hinges, so as to enable them to swing. The external joints of the rebates are to be covered by slips of metal screwed down, which may be displaced when required. These improvements are proposed to be added to old carriages of various sorts, as coaches, chariots, landaus and landaulets.

An improvement in the construction of the perch and wings of carriages is also proposed, which consists in the use of bent timbers, instead of cutting the perch and wings across the grain out of strait wood, in a curved form. It is likewise intended in some carriages to make the seats capable of folding up into boxes when not required to be in use, which is done by joining all the parts with hinges of metal or leather; and it is proposed, occasionally, to attach these folding seats to carriages as additions, which can be concealed by folding together into shallow boxes formed as above.

Inrolled, June 1821.

To THOMAS BONSOR CROMPTON, *of Farnworth, Lancashire, for an Invention of an Improvement, in Drying and Finishing Paper by certain means hitherto unused for that purpose.*

THIS invention applicable to paper making, is a mode of conducting the newly formed paper, by means of cloths or endless felt, over heated cylinders, for the purpose of drying it in a more expeditious manner than has hitherto been adopted. These cloths or felt are proposed to be

made by the union of linen warp, and woollen weft. The machine, applied to the purpose of drying and finishing paper, consists of several revolving hollow metal cylinders, mounted in an horizontal frame, proposed to be heated by steam. These heated cylinders are turned by a series of spur-wheels, one upon the axis of each cylinder, with cog-wheels intervening, which take into teeth and connect the whole train together; the power for driving the train being communicated to any one of the wheels, as may be most convenient.

Along the side of the machine is carried a steam-pipe, from which the steam is passed by cocks through the axles of the cylinders for the purpose of heating them. There are a number of small rollers, both above and below the cylinders, over which the cloth or felt passes, forming to each cylinder and its set of rollers an endless felt, which receives the wet paper as it is first delivered, and conducts it round the series of drying cylinders.

When the paper has arrived at the end of the machine it is discharged in a dry and finished state, and here a pair of sheers or cutters are placed, for the purpose of cutting the paper as delivered into sheets of any required length. There are screws connected to the lower rollers for the purpose of lightening or loosening the felt, in the event of the paper expanding or contracting as it passes through the machine. The cutter attached to the end of the machine is put in motion by means of a tappet-wheel or an excentric connected with the revolving train; by which the moveable blade is made to cut off the paper to any length regulated to the speed of the tappet-wheel.

The patentee observes, that he shall consider " any method of conveying paper over heated rollers or plates for the purpose of drying it, by means of a conductor or

conductors, as well as the application of the sheers," to an infringement of his patent right.

Inrolled, April, 1821.

To WILLIAM FREDERICK COLLARD, *of Tottenham Court Road, London, for certain Improvements in Piano-fortes.*

THESE improvements are applicable to both upright and horizontal piano-fortes, and consist of an additional bridge, called a *bridge of reverberation*, and a *general moveable damper or harmonic swell.* This bridge of reverberation is placed on the outside of the ordinary bridge upon the sound board and nearly parallel to it. Between the two bridges is the bar called the general damper, lying upon the strings beyond the ordinary bridge; which bar is curved into a form nearly parallel with the two bridges, and is made to rise or fall upon arms or cranks by the agency of a pedal below. The under side of the damper-bar is covered with cloth or leather, and when raised or lifted off the strings, by means of the pedal, the reverberating tones of the strings are permitted to sound, which, in playing the instrument, produce a harmonious swell. The form of the parts may be varied according to circumstances, and the lifting of the damper-bar be effected in various ways.

Inrolled, May, 1821.

To STEPHEN WILSON, ESQ. *of Streatham, Surry, in consequence of discoveries by himself, and communications made to him by Foreigners residing abroad, that he is in possession of certain Improvements in Machinery for Weaving Figured goods.*

THESE improvements consist in the construction of

machinery, by means of which card slips or pasteboards, for directing the patterns of weaving, are pierced, which cards or slips are used in the weaving, already introduced into this country, (described in the patent of Francis Lambert, see page 95 of the present Vol. of this journal.) By this machinery, the particular select punches required for the piercing of each distinct card, are placed in their relative situations preparatory to the operation of piercing, and also by its means a card may be pierced or punched with any number of holes at one operation. This disposition of the punches is effected by means of rods connected to cords disposed in a frame "in the nature of a *false simple*, on which the pattern of the work to be performed is first read in."

These improved pierced cards, slips, or pasteboards, apply to a weaving apparatus, which is so arranged that a figure to be wrought can be extended to any distance along the loom, and by that means the loom is rendered capable of producing broad figured works; having a long lever placed in such a situation that it affords power to the foot of the weaver, and by this means enables him to draw the heaviest morintures and figured works, without the assistance of a draw-box.

The machinery for arranging the punches, consists of a frame with four upright standards, and cross-pieces, which contain a series of endless cords passing under a wooden roller at bottom, and over pulleys at the top. These pulleys are mounted on axles in two frames, placed obliquely over the top of the standard frame, which pulley frames constitute the table commonly used by weavers. In order better to explain these endless cords, Plate XII. fig 1. represents a single endless cord, 1-1, which is here shewn in operation, and part of another endless cord, 2-2.

shewn stationary. It is to be understood, that there are as many endless cords in this frame, as needles in the weaving machine; *a*, is the wooden cylinder revolving upon its axis at the lower part of the standards; *b*, *b*, the two pulleys of the pulley-frames above, over which the individual endless cord passes; *c*, a small traversing ring; to each of these rings a weight is suspended by a single thread, for the purpose of giving tension to the endless cord; *d*, is a board resembling a common comber-bar, which is supported by the cross-bars of the standard frame, and is pierced with holes, in situation and number corresponding with the perpendicular threads that pass through them, and which board keeps the threads distinct from each other.

At *e*, the endless cords pass through the eyes of wires resembling needles, which are contained in a wooden box placed in front of the machine, and shewn in this figure in section only. These wires are called the *punch-projectors*, and are guided and supported by horizontal rods and vertical pins, the latter of which pass through loops formed at the hinder part of the respective wires. At *f*, are two horizontal rods, extending the whole width of the machine, for the purpose of producing the cross in the cords; *g*, is a thick brass plate, extending along in front of the machine, and lying close to the box which holds the punch-projectors; this plate, *g*, shewn also in section, is called the *punch-holder*, and contains the same number of apertures as there are punch-projectors, and similarly disposed so as to correspond: in each of these apertures there is a punch, for the purpose of piercing the cards, slips, or pasteboards with holes, as first described; *h*, is a thick steel plate, of the same size as *g*, and shewn likewise in section, corresponding also in its number of apertures, and their disposi-

tion with the punch-projectors and the punch-holder; this plate *h*, is called the *punch-receiver*.

The object of this machine is to transfer such of the punches as may be required for piercing any individual card, from the punch-holder *g*, into the punch-receiver *h*, when they will be properly situated and ready for piercing the individual card, slip or pasteboard, with such holes as have been read in upon the machine and are required for enabling the warp-threads to be withdrawn in the loom when this card is brought against the ends of the needles. The process of transferring the patterns to the punches will be effected in the following manner.

The pattern is to be read in according to the ordinary mode, as in a false simple, upon the endless cords below the rods *f*, and passed under the revolving wooden cylinder *a*, to a sufficient height for a person in front of the machine to reach conveniently. He there takes the upper threads of the pattern called the *beard*, and draws them forward so as to introduce a stick behind the cords thus advanced, as shewn by dots, for the purpose of keeping them separate from the cords which are not intended to be operated upon. All the punch-projectors which are connected with the cords brought forward, will be thus made to pass through the corresponding apertures of the punch-holder *g*, and by that means will project the punches out of these apertures into corresponding apertures in the punch-receiver *h*. The punches will now be properly disposed for piercing the required holes, on a card, slip, or pasteboard, which is to be effected in the following manner.

Remove the punch-receiver from the front of the machine; and, having placed one of the slips of card or pasteboard between two folding-plates of metal, completely pierced with holes corresponding to the needles of the

loom, lay the punch-receiver upon these perforated plates, to which it must be made to fit by mortices and blocks, the cutting parts of the punches being downwards. Upon the back of the punch-receiver is then to be placed a plate or block studded with perpendicular pins, corresponding to the above described holes, into which the pins will fall. The plates and the blocks thus laid together are to be placed under a press, by which means the pins of the block will be made to pass through the apertures of the punch-receiver, and wherever the punch has been deposited in the receiver, by the above process, the said punches will be forced through the card, slip, or pasteboard, and pierce it with such holes as are required for effecting the figure in the loom.

Each card being thus pierced, the punch-receiver is returned to its place in front of the machine, and all the punches forced back again into the apertures of the punch-holder as at first. The next set of cords is now drawn forward by the next beard, as above described, which sends out the punch-projectors as before, and disposes the punches in the punch-receiver ready for the operation of piercing the next card. The process being thus repeated, the whole pattern is, by a number of operations, transformed to the punches, and afterwards to the cards or slips, as above described.

The improvements in various parts of the weaving machinery already in use in this country, are stated as communicated by foreigners residing abroad, and consist first, in placing the *axe carré rotatis*, or revolving-bar and its machinery which carries the pierced cards (see Lambert's patent) on the side of the loom, instead of being placed near the cane-roller, as in the machines already in use in this country; by which contrivance an opportunity is afforded

of extending the revolving-bar and machinery connected to it to any required length along the loom toward the cane-roll: and also of using two or more machines at the same loom, so as to work two or more patterns at the same time, without shifting the slips on the revolving-bar, the additional length admitting of a ground harness being added or lamms being worked at the same time as a morinture by additional slips pierced with holes being placed at the ends of the slips or pierced cards, described as above.

The second improvement in the weaving machine consists of a lever connected to a treadle for raising the block or lifting-bar, *d*, (see plate VI.) by which the workman is enabled to draw the heaviest morintures and figured-work without the assistance of a draw-box. The third improvement upon the weaving machine already in use, is in forming the needles of the loom with loops at their ends, and guiding them by horizontal rods and vertical pins as shewn in the form of the punch-projectors in plate XII, fig. 1, above described, by which contrivance, the needles will be guided and better enabled to retain their true position than in the machines heretofore used.

Inrolled, July, 1821.

The former part of this invention, (viz.) the method of *piercing cards or slips* for the purposes of figure weaving, appear to be totally distinct from the invention of a *new method of mounting and producing, and also of removing, preserving, and replacing the figure in weaving*, above alluded to, and for which Lambert obtained his patent. But by what means the improvements upon the weaving apparatus herein proposed can be brought into use without adopting the very machinery, and of course trespassing upon the patent-right of Lambert, we do not see. We

understand that some proceedings upon the legal question are about to take place between the parties; upon which subject we may perhaps, at a future time, offer a few remarks.

To George Vaughan, *Gent. of Sheffield, Yorkshire, for his Blowing Machine on a new construction, for the fusing and heating of metals, smelting ores, and supplying blasts for various other purposes.*

This machine, which is represented in perspective in plate XIII, fig. 1, is proposed to be formed as a box, *a*, *a*, *a*, by plates of cast or wrought iron united together by screw bolts, passing through flanches; in some cases, however, wood may be found to answer sufficiently well for the purpose. On the sides of the box are four valves *b*,*b*, opening inwards; and across the middle of the box is a partition for the purpose of dividing it into two distinct chambers. In the top plate are four horizontal valves, opening upwards, their openings communicating with the chambers, which valves are inclosed by the square box *c*, which is five or six inches deep. Through these horizontal valves the wind passes out of the chambers into the pipe or nozzle *d*; *e*, *e*, are two levers, their fulcrums or joints about the middle worked by cranks and crank-rods, which are, through the agency of a winch, turned by manual labour or otherwise. To the lower part of each lever is attached a fan or piston, edged with leather, which fits the air-box closely, so as to prevent the air from escaping past the fans or pistons.

This apparatus may be considered a double bellows, and acts as follows: by the revolutions of the fly-wheel the

cranks give a reciprocating motion to the levers *e*, *e*, by which the fans or pistons are moved from side to side of the air-chamber. As the four valves *b*, *b*, open inwards, the fan or piston in receding from the side of the box will cause the valve *b*, to open, and in approaching the side of the box it will cause the valve *b*, to close. As the fan recedes from the side of the box the valve opens and admits air into that side of the chamber, while the air, which occupied the other side of the chamber, is forced upwards through the horizontal valves into the square box *c*, and thence through the pipe and nozzle to the furnace.

Inrolled, *April*, 1821.

We cannot avoid expressing our surprise at meeting with the above invention under the protection of a patent granted to Mr. Vaughan, when the contrivance has been long known as the invention of Messrs. Jefferies and Halley, and for which the Society of Arts last year bestowed upon them their large silver medal and fifty guineas. (see Novel Inventions in the present number.) The blowing machine appears to differ scarcely in any other respect from that of Jefferies and Halley than in being turned upside down; the operative parts and the effect are nearly the same in both, though in our opinion the apparatus of Messrs. J. and H. is by far the most perfect and compact of the two.

Whether Mr. Vaughan thinks that inverting the apparatus, and working his bellows by means of levers, are improvements we know not, having in his specification neglected to say so; why he has adopted a fan or piston, which cannot, as far as we can see, be made to move air-tight, is equally difficult to understand, except it be for the purpose of merely varying from the appearance of the

original invention. One thing, however, is certain, that the invention of Jefferies and Halley is for the use of the public at large; and though, if it had been a subject of patent-right, the machinery of Vaughan might have been considered an infringement, yet no patent subsequently obtained for a similar apparatus can deprive the public of an invention which has been once thrown open.

To Richard Watts, *of Croton-court, Temple Bar, London, for Improvements in Inking Printing Types with Rollers; and in placing and conveying Paper on Types, and in Inking with a Cylinder.*

The improvements in the mode of inking types proposed in this patent, and the method of conveying paper on to the types to be printed, will be seen by reference to Plate XII, in which fig. 2, is a side view of the improved printing press, and fig. 3, a horizontal view of the same, the respective letters referring to the same parts in both figures. The machinery is supported upon an iron frame *a*, *a*, standing upon legs; *b*, *b*, is a rail on the side of machine, upon which the carriage *c*, *c*, runs; *d*, *d*, two inking-rollers, made of the flexible material employed for that purpose, which rollers are to the carriage *c*, and pass backward and it; *e*, *e*, is the frame that receives the pa

When the carriage *c*, *c*, with the fra zontally over the table, the inking-roll contact with the feeding-roller *f*; and ing their supply of ink, on return pass over the types, and ink the next impression; *g*, is a met

the ink on to the elastic-roller *h*, which communicates it to the wooden feeding-roller *f*.

The sheet of paper intended to be printed, is placed upon the frame *e*, *e*, and the carriage pushed forward horizontally over the form of types, the paper for the present being prevented from touching the types by slight springs, which raise the frame or tympan an inch or two above the table. The winch *i*, is now to be turned, which puts in motion the axle and band-wheels *j*, *j*; over these wheels, and several guide-pulleys, pass two endless bands *k*, *k*, and by this means the pressing cylinder *l*, is brought forward, and rolled over the table, by which the necessary pressure is obtained for printing the sheet.

The circumference of the pressing cylinder should be covered with a blanket, for the purpose of affording elasticity, and over which a linen cloth must be laced; the cylinder may be loaded so as to give any degree of pressure that may be found needful, by introducing blocks of metal, as shewn at fig. 2, by dots. Near the two extremities of the frame, pads of soft leather *m*, *m*, are placed, in order to deaden the force by which the pressing cylinder would strike against the frame, and by that means lessen the concussion.

When the pressing cylinder has passed over the types, the carriage with the tympan and paper is to be withdrawn, and the printed sheet removed, by which the inking-rollers have been again made to pass over the types, and to ink them ready for the next impression. As it is necessary that the rollers *d*, *d*, should receive continually fresh supplies of ink, this is effected at the time that the pressing cylinder is passing over the types, by the following means:—It will be seen that by the above described revolution of the axle *j*, the bevel-geer at its

and causes the ductor-roller and feeding-roller to turn, by means of which, the ink is distributed over the surface of the inking-rollers, which are, at that time, resting upon the feeding-roller. But, as the ductor-roller must always revolve the same way, it is necessary that the bevel geer should be changed when the axle and pressing cylinder are turned back again. This is effected by means of a forked lever *n*, which causes the socket with the bevel wheels to slide along the axle, and thus brings the wheels alternately into geer, according to the direction in which the pressing cylinder is, at that time, moving.

The specification concludes with these words:—"Having described one method of carrying my said invention into effect, I now proceed to declare that I do not mean or intend hereby to limit myself to this particular method only; but to avail myself of every other means by which my said horizontal carriage, and the inking rollers connected with it, can be applied to the purposes of printing, whether by means of a pressing cylinder or by pressing with flat surfaces or plattens. I also hereby claim the invention and application of a wooden cylinder for the equalization or distribution of the printing ink over the elastic rollers, in lieu of the flat surfaces of wood or metal which have hitherto been employed for that purpose."

Inrolled, September, 1820.

To WILLIAM SOUTHWELL, *of Gresse Street, Rathbone Place, for improvements on Cabinet Piano-fortes.*

THE improvements described in this patent consist of certain additional parts, which will be seen by reference to the

diagram, plate XII. fig. 8. This figure represents all the different parts which produce the action of one key; those parts of which, that are not claimed as coming within the invention, are said not to be referred to in the following description.

In this figure *a*, is a sticker in front similar in appearance to those in ordinary piano-fortes, but which in this can be taken off and on, by means of a screw and steady pin which fixes it to the but of the hammer *b*, going through a small piece of wood at *c*, which is connected to the sticker by a leather joint. At the top of the sticker is a small part left square about the sixteenth of an inch, having a coating of leather, which raises the hammer up with greater power than usual when the key is acted upon; *d*, is a back sticker about a quarter of an inch from the string, with a coating of leather for raising the damper *e*; at the same end is glued a block of wood, *f*, to receive a wire *g*, which is turned square at the upper end to raise the check lever *h*. This wire works in a socket *i*, for the purpose of keeping it steady, and, to prevent noise, is bushed with a soft material; the lower end rests as a dead weight on the key, guided by a socket on the lever rail *k*; a piece of cloth or leather being extended along the lever rail, and also along the tops of the round pieces *l*.

When the key is put in motion, it raises the check lever *h*, and puts down the other end of the check *m*, which receives the end of the hammer after the stroke is given and completely prevents the hammer from doubling or rebounding against the string. By this contrivance the hammer may be longer than in the ordinary cabinet piano-fortes, by which means the blow is more powerful and clear. There is a ruler *n*, extending from side to side of the instrument, and fastened to the uprights by

bolts, &c. so as to take off and on with ease. This ruler should have an iron bar either in the back or front to keep it from warping. There should be end-wood grooved along the ruler to receive a wire at the centre upon which the catch acts.

Inrolled, June, 1821.

To William Aldersey, *Esq. of Homerton, Middlesex, for an Invention of an Improvement on Steam Engines and other Machinery where the Crank is used.*

The object of this invention is to employ a mechanical agent in place of the crank, in all such machinery as require the alternating or reciprocating motion communicated by a first moving power, (as in the steam-engine) to be converted into a rotatory motion. In order to estimate the value of this improvement, it will be necessary to observe the inventor's remark upon the disadvantages of the crank as a mechanical agent.

"The loss of power in the use of the crank has been universally admitted, but the extent of that loss has, I believe, been known only to a few; I have therefore endeavoured to exhibit by diagram, (see Plate XII. fig. 4.) a scale, or demonstration, which states precisely the operative power and proportional loss attendant on a crank, where the pressure or power of the engine is considered to be 1." In this diagram the semicircle represents the half revolution of a crank, which is considered as a lever in the different positions of its descent from the perpendicular increasing in power, to the horizontal, and thence to the perpendicular, diminishing in power.

When the crank is perpendicular it exerts no power whatever towards turning the axle; when it is horizontal it exerts the greatest. Suppose the operative power at the horizontal position to be 112, the perpendicular of course being 0, when the crank has moved through the sine of one-eighth of its radius from the perpendicular, its operative power will be $\frac{14}{112}$, when through the sine of two-eighths $\frac{28}{112}$, the sine of three-eighths $\frac{42}{112}$, the sine of four-eighths $\frac{56}{112}$, the sine of five-eighths $\frac{70}{112}$, the sine of six-eighths $\frac{84}{112}$, the sine of seven-eighths $\frac{98}{112}$, and when it has arrived at the horizontal position the operative power will be greatest, viz. 112. As the crank descends below this line its power will diminish in the same ratio, according to the sines as above, until it has arrived at the lower perpendicular position, when its operative power ceases.

Considering the inevitable loss of power in applying the crank as a moving agent to machinery, the present invention is intended to communicate the power of turning the shaft always at that point which is in the horizontal line, or where the greatest operative force is exerted. For this purpose, a frame with a double rack, seen at Plate XII. is constructed, in which fig. 5, is a horizontal view, looking down upon the wheels; fig. 6, is a vertical section, the cog-wheel *d*, and rack *g*, being removed for the purpose of showing the action of the rack *h*, upon the cog-wheel *e*, and the pall *k*, upon the ratchet wheel *f*; fig. 7, is a front view of the wheels, the rack *h*, not being seen; the respective letters referring to the same parts in each figure.

At the top of the frame *a*, there is a rod *b*, which is to be connected to the beam of a steam-engine for the purpose of receiving a reciprocating or alternating up and

down motion; or this rod may be united to the piston-rod of the engine, and receive its alternating motion by that means; *c* is the shaft to which rotatory motion is required to be communicated, for the purpose of turning machinery; *d* and *e* are two-cogged or toothed-wheels, which slide round loosely upon the axle or shaft *c*; *f* is a ratchet-wheel firmly fitted, by means of a square or otherwise, on to the shaft *c*; *g* and *h* are two racks affixed to the sides of the frame, but not opposite to each other, which racks work into the cogged or toothed-wheels *d*, and *e*; *i*, is a pall, or click, attached to the side of the toothed-wheel *d*, which falls into the teeth of the ratchet-wheel *f*, having a spring to keep it close to the ratchet-wheel; *k* is another pall or click attached to the side of the toothed-wheel *e*, which also falls into the teeth of the ratchet-wheel *f*, with a spring as above, and by means of these palls the ratchet-wheel and shaft is not only prevented from running back, but is impelled forward, as will be described.

The action of this mechanical agent will be as follows: the power, as above said, being communicated by means of a steam-engine, or otherwise, to the rod *b*, the frame *a*, is made to ascend and descend with every stroke of the engine. In the ascent of the frame, the teeth of the rack *g*, taking into the teeth of the wheel *d*, will impel the said wheel *d*, round, and there being, as above described, a pall, *i*, on the side of this wheel, which falls into the teeth of the ratchet-wheel, *f*, the ratchet-wheel is carried round also with it, causing the main axle, *c*, to revolve. On the descent of the frame, *a*, the toothed-wheel, *d*, runs back again, but will then slide round the axle, and the pall, *i*, at the same time passing over the teeth of the ratchet without falling into them, will not

act upon the wheel, *f;* but the rack, *h,* working into the teeth of the other cogged-wheel, *e,* will now cause that, by means of its pall, *k,* to turn the ratchet-wheel, *f,* as before described; and thus, by the ascent and descent of the frame, one of the racks is constantly impelling one of the cog-wheels round, and, by means of its pall, the ratchet-wheel is hence kept continually revolving in the direction of the arrow, fig. 6; and a power which is always acting uniformly upon the cogged-wheel at its most effective point, is communicated to the main axle *c,* and hence to the machinery.

The patentee states that the whole of the invention, and all that he claims, is the application of the force, and motion of the prime mover at the extreme radius of two wheels, by means of the racks above described; and the transfer of that force and motion to the central shaft by the agency of the palls taking into the ratchet-wheels, thus producing a uniform, powerful action, instead of the variable and frequently ineffectual action of the crank. As this may be done in the manner and upon the principle above described, both in large and small machinery, and in wood, metal or other material, it becomes unnecessary to describe the dimensions of the several parts, or the materials made use of: these and the form and disposition of the frame-work or wheels must be suited to the situation and circumstances in which they are to be applied, the principle admitting of many modifications.

Inrolled June, 1821.

To ABRAHAM HENRY CHAMBERS, *Esq. of New Bond Street, London, for an improvement in the manufac-*

ture of a building Cement, composition stucco, or plaster, by means of the application and combination of certain known materials hitherto unused, (save for experiment) for that purpose.

THIS improvement consists in the employment of certain burnt or vitrified earths, and of certain metallic and other substances, which are pounded or ground to powder, and are then to be mixed with lime for the purpose of producing mortar, plaster, stucco, or building cement by whatever name it may be called.

The earthy substances proposed to be used, are all those kinds of clay or loam that are capable of becoming vitrified and intensely hard by exposure to a strong fire; consequently chalk and such earths as become soft and fall to pieces, when exposed to heat, are unfit for the purpose; but flint stones or pebbles, may be used with advantage. Trial upon a small scale may be made to determine the capability of any particular earth, by exposing it to a very strong heat, when if it runs into a vitrified state, or becomes excessively hard, it may be considered fit for the purpose, but if otherwise, it must be discarded.

The proper kinds of earth being thus selected, the material is to be heated in the interior of a brick-kiln, or furnace formed for the purpose, until it becomes completely vitrified or reduced to a state of hard, black or glassy slag; the harder the materials become, the better they will answer the purpose; and, this vitrification will sometimes be improved, by mixing refuse, or broken glass, or sand and wood-ashes.

The patentee also claims the exclusive privilege of appropriating to his improved purpose, [illegible] or vitrified materials which are not pro[illegible]

object; such as those which come from the furnaces of smelting-houses, glass-houses, foundries, &c; and, indeed all materials reduced to a state of vitrification by intense heat. These materials are then to be bruised, pounded, or ground, and sifted through a wire sieve, until reduced to such a state of fineness, as may be found convenient for mixing up as a plaster. Thus prepared, the materials may be sorted into different qualities, and put up in casks, or otherwise preserved, ready for use, and which will be found to be a most perfect artificial pozzolana.

The manner of using this material, is by mixing it with well burnt lime, instead of the sand usually employed in the composition of mortar, stucco, plaster, or cement, to which water must be added as usual, until a proper consistency is obtained. This artificial pozzolana, may be mixed with quick lime, completely pulverized and put into casks ready for use; in which case, however, it will be necessary to keep it from moisture, or exposure to the open air. The proportion of quick lime to be added to the above material, will depend entirely upon the strength of the lime used; in general, one measure of good lime will be sufficient for from three to five measures of the above material.

Another part of the improvement, consists in the use and introduction of various colours, and of various coloured bricks, which, when highly burnt or vitrified, and reduced to powder, is to be mixed up with the artificial pozzolana in order to produce shade spots or streaks, in imitation of marble and other variegated stone.

And lastly, the patentee claims the exclusive right of using the above vitrified earths, and other materials, for the purpose of mixing with lime or plaster of Paris, for the purpose of casting figures, ornaments, and mouldings of every description.

Inrolled, July, 1821.

Original Communications.

On Painting and Sculpture.

To the Editor of the London Journal of Arts and Sciences.

"To study the ancients is step sure to fame,
They studied of nature—we must do the same."
See No. 9, of this Journal.

SIR,

MUCH has been said and written upon the necessity of studying the works of the ancient masters, in order to our proficiency in the arts of painting and sculpture; and the legislature has certainly not been backward in furnishing us with models from Greece, under the impression that the *study of ancient sculpture*, at least, is the best way to make a good sculptor. Now, Sir, although I am not disposed to deny that the collection at the British Museum *being there*, has its uses, yet surely the devoted attention paid by our artists to this collection, is the most decided proof of a *want of originality* in themselves. I have rarely paid a visit to the galleries without observing some of our artists *copying* these productions of ancient art, and really one might be disposed to conclude that such artists gloried in the humble occupation of *copyists*, rather than, at once, in studying nature herself in all the variety of forms under which she is presented to us in the British Empire. Sir, it is high time for us to get rid of such leading strings!

I have called such artists *copyists*; the truth is, that all artists are, and must be from the very nature of these arts, copyists; but those artists who copy at the British Museum, are copyists from copyists, the Greek sculptors; and no one need to be told that a copy from a copy is rarely if ever so good as a copy from the original. Upon this subject I most anxiously desire to sound the *tocsin* to my countrymen, and to guard them from a

rock, upon which, without care, they will most assuredly and inevitably split. In painting as well as sculpture, NATURE is the goddess to whom our chief devoirs must be always paid, and that artist who most sedulously attends to her, I had almost said regardless of the various *copies* around him, will, and must succeed the best.

I know it, will be said, "What, Sir, has the British nation, that nation so renowned for arts and arms, devoted so much attention and expense in the acquisition of those masterpieces of antiquity, of *busts*, *basso*, and *alto-relievos*, whole length, and almost living *statues*, *sarcophagi*, *candelabra*, *amphoræ*, and a numerous *et cæteræ*, including the *head of Memnon*, that ten or twelve tonned bust, and the *columns of granite*, lying in the yard with *friezes* and *capitals* to boot, to be thus got rid of by a *trait de plume?*" I answer, the British nation, how renowned soever, has often committed, *as a nation*, very gross errors; and if the supposed friends and patrons of the arts have made the collection at the British Museum for the mere purpose of generating sculptors by stimulating them to copy these exemplars of ancient art, those friends and patrons have most egregiously mistaken the mode by which painters and sculptors are to be formed. As a collection to prove what the ancients were capable of achieving, it may have its uses, and excite that emulation without which little great in the arts can be achieved; but as MODELS from which we are never to depart, I deny its advantages;—on the contrary, I assert that to tie down the artist to models of any kind, except those afforded by nature herself, is and must be for ever injurious to the progress and perfection of the arts.

To advert now to the method in which some of these precious relics of antiquity were obtained from Greece,

cannot be of much service; but what the Greeks thought of the plunder may be tolerably well estimated by the following note from Lord Byron's Childe Harold:— "When the last of the Metopes was taken from the Parthenon, and in moving it, great part of the superstructure, with one of the triglyphs was thrown down by the workmen whom Lord Elgin employed, the Disdar who beheld the mischief done to the building, took his pipe from his mouth, dropped a tear, and in a supplicating tone of voice said to Lusieri, Τέλος!".

Of the execution of the paintings of the ancients, we are left almost entirely to our own imaginations, but it does not appear that painting on canvas was much practised by them. The same rules, however, are necessary in the formation of a good painter, as of a good sculptor; and from the progress which painting has made in this as well as other countries, *without the assistance of ancient models*, there is every reason to conclude that the progress of both these arts is best promoted by a sedulous and careful study of the first and most enlightened schoolmistress, NATURE HERSELF. Do we want a *bouquet of flowers*? shall it be copied from another *copy*? or rather shall we not go at once into the garden, the field, the sequestered valley or the mountain, to cull a living example. Is the *human-face* divine, to be pourtrayed? Is a living *landscape* to be set before us? Where shall we find any thing equal to nature herself, the sparkling eye, the intelligent mouth, the waving trees, the sunshine, the shade, the grove, the dell, the cataract, and the rock.

"Who can paint like nature?"

I am, Sir, wishing our artists more of nature and less of art, Yours, &c. A. B.

Great Russell-street,
July 19, 1821.

On Chain Cables.

To the Editor of the London Journal of Arts, &c.

SIR,

We have observed with concern the remarks you have made in your No. VIII, page 93, respecting our Patent Chain Cables, by stating, see the words, "the second mode, viz. the spindled-shaped stay, &c." on to the end. We beg to remark that if you will have the goodness to examine our specification, you will find you misconceive the principle of our invention, and we hope you will correct and explain the same in your next number; as it stands at present, it is not only incorrect, but speaking greatly to its prejudice. We lay a claim for a new invented link, strengthened on the sides by projections to receive a stay, "round, pointed, or otherwise," and which does not clash with Mr. Brunton's patent for a broad-headed stay. Mr. Brown took out a patent for a twisted link which had no stay, although he afterwards inserted one, of a spindle or barley-corn shape, thereby perforating and weakening the sides of the links, which our patent, on the contrary, completely protects and strengthens; the broad-headed stay is liable to fracture and chipping; ours never can be injured, and, by being shortened by the advance of the projections on the sides of the link, is *strongest* and most secure by the manner in which its ends enter the same, without invalidating the CYLINDRICAL *part of the link*, which was the case when the barley-corn stay was inserted in a *plain round bolt*.

This regards the second figure of our patent, on which plan we are at present manufacturing; and we would recommend your perusal of our enrolled specification, wherein we challenge any mechanic, or individual con-

versant with the manufacture of iron and its productions, to deny either the novelty or improvement of our patent, considering the preference and success we have met with as the most demonstrative proofs of its utility.

We are, Sir,

Yours, &c.

W. and D. W. ACRAMAN.

Bristol, July 11, 1821.

Note of the Editor. We may at some future opportunity make a few observations on this subject; the lateness of its coming to hand prevents our attending to it at present.

Description of a New Fruit Gatherer.

To the Editor of the London Journal of Arts, &c.

SIR,

IN No. II. of your Journal, page 137, you have described Mr. Lane's fruit gatherer, and for which a reward was given him by the Society of Arts. Having invented one which I believe superior to Mr. Lane's, I sent a description of it to the Society, from whom I received a notification that "my endeavours in this instance are not entitled to the Society's reward, but that they considered themselves obliged to me for my good intention."

You have hinted that perhaps the spirits of the Spanish Inquisition, driven from that country, have taken up their abode at the Adelphi. I am sorry that I sent a description of this apparatus to the Society, before I saw your sixth number. I now send you a drawing and a description of it, and feel persuaded that if it be fairly tried, it will be found superior to Mr. Lane's.

I am, Sir, yours, &c.

Lancaster, June 4, 1821. MATTHEW SAUL.

This apparatus (see fig. 8. plate XI.) consists of a pair of cutters *a* and *b*, attached to a long pole, which may be lengthened by screwed joints or otherwise. At the lower part of the pole is a lever or jointed handle *c*, which may be attached by the socket and screw to the pole at any convenient or required distance from that end; *d*, is the lever or arm of the moving chap, having a spring under it to keep it open; from the end of this lever a string leads down to the handle, in its way passing over the pulley *e*; the cutters are so connected to the pole by a joint and arch *f*, that they may be set at any angle required for the purpose of getting at the fruit readily.

The apparatus being raised so that the stalks of the fruit may fall between the cutters, the hand is applied to the handle *c*, by which the string is pulled and the stalks cut asunder, when the fruit drops into the basket *h*, and is there safely deposited until full. Half the top of the basket is proposed to be covered, in order to prevent the fruit from falling out, when the pole is brought down with a full basket.

Spots on the Sun.

To the Editor of the London Journal of Arts, &c.

SIR,

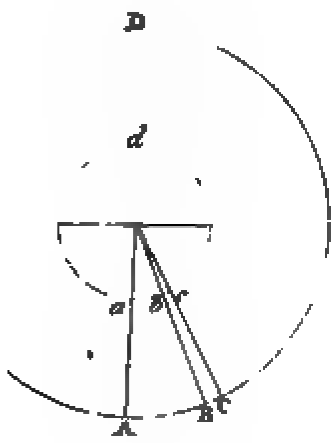
SINCE I occupied a few pages in your valuable Journal, the sun's disc has been free from spots, excepting four days, therefore my remarks in this number, must be upon quotations from others who have noticed these singular phenomena.

The earliest period at which they seem to have been

PLATE

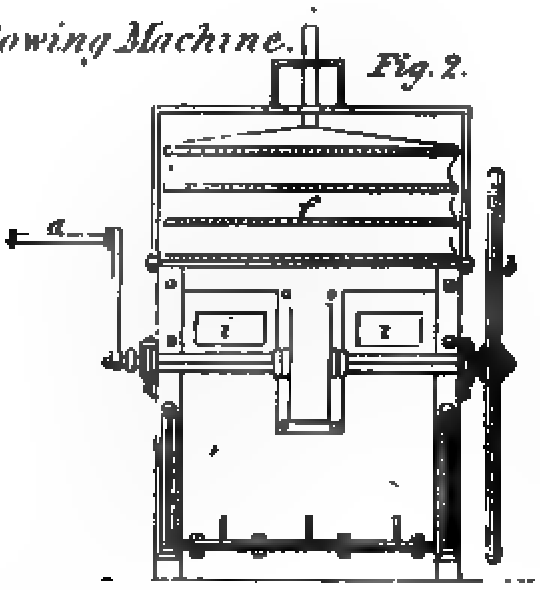
Adams, on the Suns Spots.

Fig. 4.



ys. Blowing Machine.

Fig. 2.



Vaughans, Blowing Machine

Fig 1

W Newton del

T Owen sculp

noticed, is 1660, where Mr. Boyle gives the following general account of them: they have no regular motion, but appear to move faster when in the middle of the sun's disc than when towards the limb. On the 27th of April he observed a spot on the eastern edge of the sun's disc, which remained on the sun for twelve days; he then speaks of its return or re-entrance on the eastern edge, which he and several others first observed sixteen days after its disappearance; they assert it to be the same spot, because the figure, colour, and bulk were the same; which I dare to affirm are very poor reasons indeed. 1st, in respect to the figure and bulk, I, in my few observations comparatively speaking, have seen many spots of the same figure; especially of so common a figure as this he now speaks of, quadrangular; and indeed have seen two on the disc at the same time, with a power of about 120 times, between which I could neither discover a difference in figure or bulk; and, 2dly, in respect to colour, some are lighter and some darker, but so many alike that it appears ridiculous to say a spot is known by its colour.

The reason of a spot being for a greater length of time hid from our sight than visible to us, Mr. Boyle does not explain; I think it cannot be better explained than by the following figure, (see Plate XIII. fig. 4.) which I borrow from Long in his Astronomy, page 474. As the earth revolves round the sun the same way with the sun's rotation, the periodical revolution of a spot, seen from the earth, is longer than it would appear if it were viewed by an eye at rest: thus, in the figure let A, B, C, D, be the orbit of the earth, *a*, *b*, *c*, *d*, the equator of the sun; let *a*, be a spot seen in the middle of the disc by a spectator on the earth at A; the sun's rotation, carrying the spot round through *b*, *c*, *d*, according to the order of the letters,

will in about 25 days bring it again to *a*; but, during that interval, the earth will be at B, and the middle of the disc will be at *b*; so that about two days more must be spent before a spectator upon the earth at C, will view the spot in the middle of the then apparent disc *c*. This is much the same case as that of the synodical month being longer than the periodical.

The various opinions about the nature and formation of the solar spots are as follow:

Some have thought that the sun is an opaque body, mountainous and uneven as our earth, and that it is covered with a fiery luminous fluid; that this fluid is subject to ebbing and flowing after the manner of our tides; so as sometimes to leave uncovered the tops of rocks or hills, which appear like black spots: and that the penumbræ around them are caused by a kind of froth.

Others have imagined, that the fluid which sends us so much light and heat, contains a nucleus or solid globe, wherein, are several volcanoes, that, like Ætna or Vesuvius, from time to time, cast forth quantities of bituminous matter up to the surface of the sun, and form those spots which are seen thereon; and, that, as this matter is gradually changed and consumed by the luminous fluid, the spots disappear for a time; but are seen to rise again in the same places, when these volcanoes cast up new matter.

A third opinion is that the sun consists of a fiery luminous fluid, wherein are immersed several opaque bodies of irregular shapes; and that these bodies by the rapid motion of the sun, are sometimes buoyed or raised up to the surface where they form the appearance of spots; which seem to change their shapes, according as different sides of those bodies present themselves to our view.

The last opinion I shall mention is, that the sun consists of a fluid in continual agitation; that, by the rapid

motion of the fluid, some parts more gross than the rest are carried up to the surface of that luminary, in like manner as scum rises on the top of melted metal, or any thing that is boiling; that these scums, as they are differently agitated by the motion of the fluid, form themselves into those different shapes which we see in the solar spots; and, besides the optical change, are diminished in their apparent magnitude, recede a little from, or approach nearer to, one another, and are at last entirely dissipated by the continual rapid motion of the fluid, or are consumed thereby or absorbed therein.

The optical change of the solar spots, here mentioned, is owing to their being seen upon a globe differently turned towards us: if we imagine the globe of the sun to have a number of circles drawn upon its surface, all passing through his poles, and cutting his equator at equal distances, these circles, which we may call meridians, if they were visible, would appear to us at unequal distances. Now suppose a spot were round, and so large as to reach from one meridian to another, it would appear round only when it was in the middle of that half of the globe which is towards our earth, for then we view the full extent of it in length and breadth: in every other place, it turns away from us, and appears narrower, though of the same length, the farther from the middle; and at its coming on at the eastern limb, and going off at the western limb, it appears as small as a thread, the thin edge of it being all that we then see. This apparent change of the shape in the solar spots is a plain proof that the sun is a globe.

I am, Sir, yours,

CHARLES H. ADAMS.

Lower Edmonton.

Novel Inventions.

Jefferies and Halley's Blowing Machine.

Messrs. Jefferies and Halley, of Great Guildford-street, Southwark, have invented an improved blowing-machine, or apparatus to be used in the smelting or fusing of metals, which consists of a box of cast-iron, shewn in Plate XIII. fig. 2, being an external view of the back of the machine, and fig. 3. a section cut through the middle parallel to the sides exhibiting the interior, and its operative parts, the respective letters referring to the same parts in both figures.

a, is a crank or handle to be worked by one, two, or more men, according to the size of the machine; or any other moving power may be applied to this part if required. *b*, is a fly-wheel fixed on the shaft or axle of the crank, merely to regulate the motion; *c*, is a crank in the middle of the said shaft or axle, which works in an air-tight semicircular box. By means of this crank, the rotatory motion of the axle gives an alternating or reciprocating motion to the flap *d*, of the bellows within the box; *e*, is the nozzle, through which the wind is expelled, and *f*, the flexible head or regulator.

The external box is wedge-formed, and rendered air-tight by luting, being composed of cast-iron plates, flanched and bolted together; the flap which vibrates within, separates the box into two air chambers, by means of a flexible leather coating, which connects the flap and front part of the machine together. The axle and crank *c*, being put in motion as above described, cause the flap *d*, to vibrate, which, on receding from the back of the box, allows the valves *i*, *i*, to open inwards, and admit air into the air chamber *A*; on the return of the flap, the

valves close, and the air which occupied the chamber *A*, is forced up through the valve g, into the head or regulator *f*. At the same time that the air is thus forced out of the chamber *A*, the valves in front of the machine, opening inwards, admit air into the chamber *B*, whence, by the collapsing of the leather on the return of the flap, the air is forced through the valve *h*.

Thus, by the constant vibration of the flap *d*, the air is continually expelled from one of the chambers *A*, or *B*; and by passing from *A*, through the valve *g*, into the inflexible head or regulator *f*, the top of which is pressed downwards by weights, and hence down the passage to the nozzle, a continued uninterrupted blast of wind is impelled through the exit pipe from one or other of the chambers, through the agency of the regulating head.

This machine may be considered a double bellows, and by the vertical position of the flap, will require but a comparatively small degree of power, to keep the bellows in full action.

Certificates of the effective operation of these machines, from several foundries, and also from His Majesty's Dock-yard, Deptford, where they are in use, were in the early part of last year, laid before the Society of Arts, who in consequence, presented Messrs. Jefferies and Halley with a silver medal, and a further reward of fifty guineas, for their invention; a perfect working model of the machine is placed in the Society's repository, for the inspection of the public. See Vol. 38, of the Society's Transactions.

Bed-stone of a Corn Mill.

Mr. T. Austen of Waltham Abbey Mills has invented an improved mode of supporting the bed-stone of a corn-

mill, in which improvement it is rendered capable of being adjusted and levelled by means of screws, in a much better and more expeditious manner than has heretofore been practised. The methods hitherto adopted to adjust the bed-stone of a mill, are attended with much difficulty and loss both of time and produce, it being particularly requisite that all bed-stones of corn-mills should be kept perfectly level and firm on their bearing, in order to obtain flour of good quality. To obviate this difficulty, the bed-stone upon the improved principle, is fixed in a strong cast-iron box bedded in plaster of Paris. This is mounted on a strong frame of cast-iron, fixed into the floor and rafters of the mill, having three large screws rising from the under part of the frame, upon the ends of which three screws, the box containing the bed-stone is supported, (see fig. 4. plate IX.*) and is adjusted on its level or horizontal position, by the rising or lowering the screws. The adjustment in a lateral direction, is effected by means of four screws passing through the sides of the frame as shewn in the fig.; and the upper part is enclosed with a casing of wood.

This contrivance has been three years in use at the Waltham Abbey corn-mill, and is found to be perfectly firm in its bearing, and fully to answer its intended purpose: it produces more weight of flour and less offal from a given quantity of wheat, than the same mill did formerly by wedging up the bed-stone. Many testimonials of the advantages derived from this improvement, have been laid before the Sociey of Arts, and they have accordingly bestowed upon Mr. Austen the honorary reward of their silver medal. See Vol. XXXVIII. of their Transactions.

* Owing to some accident, this article was misplaced and omitted in the last number, where the plate No. IX. will be found to which it refers.

Review of New Publications.

[A literary and critical notice in our Journal of the most important of those works which are continually issuing from the press, and which relate to the Arts and Sciences, has been more than once pressed upon our attention. We have therefore determined to devote a few pages of each number to this subject; and we trust that in our criticisms rigid impartiality, will be found a distinguishing characteristic.

[Authors and Publishers who desire an early notice of their works are requested to transmit copies of the same to our publishers.]

Culinary Chemistry, exhibiting the Scientific principles of Cookery, with concise instructions for preparing good and wholesome Pickles, Vinegar, Conserves, Fruit, Jellies, Marmalades and various alimentary substances employed in Domestic Economy, with observations on the chemical constitution and nutritive qualities of different kinds of food. By FREDERICK ACCUM. 12mo. pp. 356.

THE name of ACCUM has been for some time past familiar to the scientific, and, most of all, to the reading public. The "Art of Brewing," "The Art of making Wine," "Death in the Pot," or rather "A Treatise on the Adulterations of Food," &c. &c. There has been, however, mingled with these different *brochures*, for they can hardly be called volumes, a good deal of the art of book-making, so that we have very often had occasion to regret the union of so much talent with so much of the *auri sacra fames*. The treatise on the Adulterations of Food would have soon been forgotten but for the witty articles which it elicited, especially one in a northern magazine, and which Mr. A. or his publishers take care shall accompany his various works, as a sort of *bonne bouche*. But to our task.

The present *volume*, we suppose we must call it, is in the usual style of Mr. A. and although it bears evident marks of the scissors, will be found, nevertheless, equal in quality to, we believe, any of the lately published works of this gentleman. It contains some useful information, but in so attenuated a shape, that the substance of the volume might, by an adroit compiler, be reduced, without any injury to its contents, to a very few pages. The science of dilatation is, however, in these times of scarcity of employment a somewhat useful one; in this case the paper-maker and the printer, will not, we presume, have any reason to complain.

We shall not (because we have neither room nor inclination) go through *seriatim* Mr. Accum s book. We cannot, however, avoid observing that Mr. A. seems still disposed to keep the fears of mankind unnecessarily awake. He says, page 124, "Every body knows that potatoes in a raw state are nauseous and unpalatable. It is not, perhaps, so generally known that the potatoe (*solanum tuberosum*) belongs to the night-shade genus of plants which are all more or less poisonous. If potatoes were used raw in any quantity they would be deleterious to man: nor does it disprove this, that cattle eat them with impunity." Now, although we do not think it at all likely that any person will be disposed to eat potatoes raw, we ask where is the proof that raw potatoes are poisonous to man? On the contrary is not this *assumption* founded merely on the circumstance of the potatoe being one of the species of the genus *solanum?* an assumption quite unphilosophical and not borne out by facts.

Perhaps, as a fair specimen of the work, the following may be selected, and as it contains information not generally known, we the more readily consign it to our pages.

BEST METHOD OF PRESERVING ALL KINDS OF COOKED BUTCHER'S MEAT, FISH OR POULTRY.

" This process was discovered by Mr. Appert, and is pursued in the Metropolis upon a large scale by Messrs. Donkin and Gamble and has met the approbation of many sea-faring persons, to whom it is more immediately useful.

" Let the substance to be preserved be first parboiled, or rather somewhat more, the bones of the meat being previously removed. Put the meat into a tin cylinder, fill up the vessel with the broth, and then solder on the lid, furnished with a small hole. When this has been done, let the tin vessel thus prepared, be placed in water and heated to the boiling point, to complete the remainder of the cooking of the meat. The hole of the lid is now closed perfectly by soldering, whilst the air is rushing out. The vessel is then allowed to cool, and from the diminution of the volume in consequence of the reduction of temperature, both ends of the cylinder are pressed inwards and become concave. The tin-cases, thus hermetically sealed, are exposed in a test-chamber for at least a month, to a temperature above what they are ever likely to encounter; from 90° to 110° of Fahrenheit. If the process has failed putrefaction takes place, and gas is evolved, which, in process of time, will bulge at both ends of the case, so as to render them convex instead of concave. But the contents of whatever cases stand the test will infallibly keep perfectly sweet and good in any climate, and for any length of time. If there was any taint about the meat when put up, it inevitably ferments and is detected in the proving process."

Eighteen pages are occupied with the article " Coffee;" and, verily, Mr. Accum is superb in his eulogiums on this roasted vegetable and the beverage prepared from it. For ourselves and a pretty extensive experience, we can

say that it is by no means deserving of these lofty commendations.

We have looked most anxiously for his *observations on the chemical constitution and nutritive qualities of different kinds of food* and have been greatly disappointed: on this subject the book is meagre in the extreme.

His directions for preserving fruit must not be implicitly relied on, p. 276. Pears, apples &c. should not be kept in a well-aired room, if by well-aired be meant a room into which the air can enter readily; for, by such means, great changes of temperature will be the result; and such changes are very prejudicial to the fruit. *A dry, cold room, where little or no circulation of air takes place, and where the temperature varies little, is the best for the preservation of fruit.*

To conclude, this work contains many useful hints and some facts, but it by no means fulfils the objects which the title may lead us to expect. The peculiar circumstances under which it was prepared for publication must, of course, be taken into the account; on these we are not disposed to comment.

Practical Economy; or the application of Modern Discoveries to the purposes of Domestic Life. 12mo. pp. 359.

To apply the arts to our fireside enjoyments, to the structure and furniture of our houses, and to the numerous *et cætera* of domestic life, is at all times a praiseworthy endeavour, and therefore upon all such efforts we are disposed to look with commendation. The present little volume attracts our attention by the unostentatious manner, and the *naïveté* with which it is got up, and

is a manual in which much useful information will be found.

Perhaps if it had been more condensed it would have lost nothing of its usefulness. The last section relative to the employment of the poor, is deserving the attention of our political economists. We are sorry to observe in the preface the following remark. "As to the situation most favourable to economy; some may think it better practised in France. But instead of going to an enemy's country (for such it always must be) to live cheap, is it not better to practise the art of cheap living in our own." Surely the author of this sentence must have resigned his better judgment in thus consigning France and England to eternal enmity. It is certainly high time that the opinion that France and England are natural enemies, that they must always continue such, should no longer disgrace either side of the water. France and England are not natural enemies, neither must France be always an enemy's country. There are no substantial reasons why France and England may not, for the future, continue in peace and amity: in the cultivation of the arts of friendly intercourse, and mutual scientific improvement. We wish our writers on both sides of the water would be more circumspect on this subject, and write with better principles and with a better spirit. The demoralizing evil genius *revenge* has too long shed a baleful influence amongst us; we must adopt a kinder, and more benevolent course.

The Family Cyclopædia, being a manual of Useful and Necessary knowledge, &c. &c. By JAMES JENNINGS. 2 vols. 8vo.

WE have been so often imposed upon by the title of "Cyclopædia," that we felt some reluctance in taking up

the present volume for examination;—a long title-page full of high sounding promises, which, too often "lead to nothing"—or what is far worse into error and absurdity—induced us to suppose that the "Family Cyclopædia" was merely a "made book"—got up *secundum-artem*, with the assistance of scissors and wafers, and but little waste of ink and pen:—that it would shortly join the long train of its useless and cumbrous predecessors,—and, be safely and silently deposited in the "tomb of all the Capulets." As it is our plan, however, always to *cut open the leaves* of a new book, and to read before we criticise, we began seriously and doggedly to peruse the principal articles of this work, and we are happy to say, that we have been most agreeably disappointed in our forebodings and conjectures.

From the tone in which the greater part of the Family Cyclopædia is written, and from the uniformity of character apparent throughout, it will be obvious to every one, that this is an entirely *original* work, and completely exempt from the censure justly bestowed on most introductions to Domestic Economy:—the science, taste, and good sense of the author are visible in every page of this laborious production; and his benevolent attempts to ameliorate the condition of his fellow creatures, by improvement in morals and education, demand our warmest praise. This excellent manual of knowledge has already, we understand, been very favourably received in families as a book of daily reference in the common concerns of life; to such persons also as reside at a distance from great towns and from medical aid,—or who are inhabitants of the British Colonies (particularly to all settlers in new countries)—the Family Cyclopædia is really invaluable, as it forms a *portable Library* of useful knowledge, of *easy reference*, and contains a great variety of informa-

tion, not to be found in other works of similar pretensions or of greater magnitude.

Notwithstanding the various subjects treated in these comprehensive volumes, the author's style is generally neat and perspicuous, and while he studiously avoids coarse and vulgar expressions, he is never technical or obscure. The readers of our journal will find much practicable and useful information on the subject of the arts in this work, which Mr. Jennings seems to have obtained from the best and most authentic sources, as well as having added much original matter of his own. As a specimen of his talent in this way, we select the following practical and original article; several others from this work having enriched many of our preceding numbers.

CHIMNEY.

"The most common, as well as the most convenient dimensions for the chimneys of sitting rooms, are the following: width from three feet, to three feet and a half; height of the mantle-piece, three feet from the floor; depth, eighteen inches; the aperture for smoke, after being gradually contracted, ought to be fourteen inches by twelve throughout; and where these dimensions are complied with, no buildings or tree higher than the chimney in the immediate neighbourhood, and the grate *properly set*, and no irregular draught caused in the room, by a variety of doors or other impediments, the chimney will not fail to carry up the smoke well.

The cure of smoky chimneys has engaged the attention of both scientific and ignorant persons, and a great deal has been said and written upon the subject, we think, to very little purpose, indeed, considering the state of other arts among us. A good deal has been said, too, of the rarefaction of the air, but we think unnecessarily. It is well known that the combustion of fire-wood and coal,

disengages a variety of gases lighter than atmospheric air, and that these gases ascend the chimney as a matter of course; at the same time, and at the very place where these gases are disengaged, is disengaged also a quantity of dense black matter, which, if the current of air passing up the chimney be not powerful enough to carry up, descends from under the mantle-piece and pours out into the room, and the fire-place is then said to smoke. Now, suppose the aperture under such circumstances to be three feet by one foot and a half; we have, in general, nothing more to do to cure this smoky chimney, than to reduce the size of the aperture every way, and that too as nearly as possible, or convenient to the very spot where the heavy smoke becomes first disengaged from the combustible materials: for, by contracting the column of air passing up the chimney we increase its power for taking up heavy smoke. Upon this principle, we affirm it is, that all chimneys built as above, will most certainly carry up the smoke well. And upon this principle also it is, that most chimneys which smoke may be cured: that is, by the contraction of the space at the exit of the smoke from the fire. Upon this principle too it is that register grates are constructed.

For the cure of smoky chimnies, not depending upon the *contraction* of the *draught*, other means must be sought. In general we may be sure that a chimney below other buildings, trees, or even a steep hill in the immediate neighbourhood, will smoke in certain directions of the wind; and although, in some cases, such smoking may be remedied, in others it is absolutely irremediable. To prevent also the smoking of large and open fire-places, frequently found in the kitchens of farm houses, and where many doors open into the kitchen, producing a counter draught to the chimney is generally difficult and, in most

cases, impossible, unless a contraction of the fire-place be submitted to, and the mantle-piece lowered, in which case such chimneys carry smoke as well as others in the warm sitting rooms of towns.

In building chimneys it ought to be an invariable rule, never to let one communicate with or discharge itself into another: from this circumstance alone many chimneys smoke, and, not unfrequently, disastrous fires have happened.

Chimneys sometimes smoke from their being too small; in this case nothing but enlarging them can cure them. In other cases they smoke merely from a collection of soot, the removal of which obviates the inconvenience."

In the articles, *bread*, *brewing*, *malt*, *wine*, *&c.* much has been done to remove the obscurity and ignorance under which the different processes are at present conducted; and proper directions are given, founded on scientific principles, which cannot fail to improve the health and save the money of the consumer.

Polytechnic and Scientific Intelligence.

Great Britain.

Society of Arts.

This Society met at Freemasons' Hall, on the 30th of May, for the distribution of the rewards which had been adjudged during the last session, His Royal Highness the Duke of Sussex in the chair.

In the class of mechanics the number of rewards were less than usual, all of which we have noticed in our reports of the Society in our preceding numbers.

In the class of manufactures, Mr. Salisbury of Bromp-

ton, received the smaller silver medal for matting made of the *typha latifolia*, (cat's tail.)

In the class of chemistry and mineralogy, Mr. Bishop of Pistyll, near Holywell, received the smaller gold medal for the discovery of mill-stones of a superior quality in the Halkin mountains, Flintshire.

In the class of agriculture, C. Fyshe Palmer, Esq. of Oakingham, Bucks, received the larger silver medal for sowing 216 bushels of acorns on 240 acres; likewise the large gold medal for planting 280 acres with 893,420 forest trees; and another large gold medal for planting 30,700 oaks for timber.

Thomas Wilkinson, Esq. of Fitzroy-square, the large gold medal for sowing 240 bushels of acorns on 260 acres.

Sir W. Templer Pole, Bart. of Shute House, Axminster, the lesser gold medal for raising 896,000 oaks from acorns.

The Hon. Thomas Potts, Esq, of Chester, the large silver medal for planting 124 acres with 528,240 forest trees.

Edward Dawson, Esq. of Aldcliffe Hall, near Lancaster, the large gold medal for embanking 156 acres of marsh land from the sea.

In the class of polite arts sixty gold or silver medals and palettes were bestowed, principally upon juvenile artists, for performances of various merit in architecture, sculpture, painting, engraving and drawing.

After the distribution, the Society adjourned their sittings until the first Wednesday in November next; during which recess, a committee of artists and others are employed in preparing Vol. XXXIX. of their Transactions.

Royal Society.

The following papers have been read at this Society, since our last report.

May 3. Observations on the variation of local heat amongst the Garrow Hills, by D. SCOTT, Esq.

On some subterraneous trees, discovered at the foot of the cliffs about a mile to the eastward of Maudsley, by Lieut. JEFFERSON MILES.

Case of a diseased Enlargement of the Glands of the neck, by JOHN HOWSHIP.

10th. Some remarks on Meteorology, by LUKE HOWARD, Esq.

A calculation of some observations of the solar Eclipse on the 7th of September, 1820, by Mr. C. RUMKER.

17th. On the Anatomy of certain parts of the Globe of the Eye, by ARTHUR JACOB, M.D.

24th. On the absolute Zero, by Mr. HERAPATH.

31st. The reading of Mr. Herapath's paper on the absolute Zero was concluded.

The object of Mr. Herapath has been to determine the *law of temperature*, and the point of absolute cold. For this purpose, he contrived an apparatus for obviating the effects of radiation; and having mixed equal weights of mercury at a very high and low temperature, he carefully ascertained the temperature of this mixture. In seven experiments of his own, thus made, and two of M. de Luc's, he found that the results followed a law from which they differed, at a medium, not more than $\frac{1}{10}$th of a degree. This law is, that the square of the temperature of a given portion of gas, varies as the elasticity and volume conjointly; and, therefore, when either continues the same, the temperature is as the square root of the other. Hence Mr. Herapath finds, that the heat of boil-

ing water is to that of melting ice as $\sqrt{11}$ to $\sqrt{18}$; or, as 1.1726 to 1 nearly. The point of absolute cold, he also determines in a manner independent of the theory of heat, from the principle of an air thermometer.

June 7th. On the Re-measurement of Sir J. SHUCKBURGH's cube, cylinder, and sphere, by CAPT. KATER.

21st. On the parallax of the fixed stars, by Dr. BRINKLY.

Geological Society.

March 16th. The reading of Mr. STRANGWAY's paper on the Geology of Russia, was continued.

A paper has also been read at this Society, containing an account of a new fossil mineral, forming a link between the Ichthyosaurus and Crocodile, and also some general remarks on the osteology of the Ichthyosaurus; from the Observations of H. T. De la BECHE, Esq., and the Rev. W. D. CONYBEARE. This memoir, contains a notice of the discovery of the remains of an entirely new animal, allied to the *Lacerta* order, among the fossil bones imbedded in the lias, to which the name of *Plesiosaurus* has been assigned. This animal is highly interesting, as it exhibits in its structure a link between the existing genera of the above order, and the very remarkable genus Ichthyosaurus or Proteasaurus, between which and the genus Crocodile, it would occupy an intermediate place in a natural arrangement.

School of Arts.

A *School of Arts* has been established in Edinburgh for the instruction of mechanics in such branches of science as are of practical application in their several trades. Lectures on Practical Mechanics and Practical Che-

mistry, will be delivered twice a week during the winter season. A library, containing books on popular and practical science, has already been established. The institution will be conducted under the direction of a committee, consisting of Dr. BREWSTER, Professor PILLANS, and twelve other literary and scientific gentlemen. The subscription is proposed to be 15*s.* for the winter.

Weights and Measures.

THE *third* report of the Commissioners appointed by His Majesty to consider the subject of weights and measures, has been published; it is dated, London, March 31, 1821, and recommends the adoption of the regulations and modifications suggested in the former reports, which are principally these:—

That the parliamentary standard yard, made by Bird in 1760, be henceforward considered as the authentic legal standard of the British empire; and, that it be identified by declaring, that 39.1393 inches of this standard at the temperature of 62° of Fahrenheit have been found equal to the length of a pendulum, supposed to vibrate seconds in London, on the level of the sea, and in a vacuum.

That the parliamentary standard troy pound, according to the two pound weight made in 1758, remain unaltered; and, that 7000 troy grains be declared to constitute an avoirdupois pound; the cubic inch of distilled water being found to weigh at 62° in a vacuum, 252.72 parliamentary grains.

That the ale and corn gallon be restored to their original equality, by taking for the statutable common gallon of the British empire a mean value, such, that a gallon of common water may weigh 10 pounds avoirdupois in ordinary circumstances, its contents being nearly 277,3 cubic

inches, and that correct standards of this imperial gallon, and of the bushel, peck, quart, and pint derived from it, and of their parts, be procured without delay for the Exchequer, and for such other offices in His Majesty's dominions, as may be judged most convenient.

But whether any further legislative enactments are required for enforcing a uniformity of practice throughout the British Empire, the commissioners avow themselves incompetent to determine. They recommend, however, an increase of the facility of a ready recurrence to the legal standards, and also the giving of a greater degree of publicity to the appendix of their last report, which contains a comparison of the customary measures employed throughout the country.

Application of Coal-oil to Lamps.

Large quantities of coal-oil are now prepared at once from the coal in Scotland, and much is also obtained by distilling coal-tar. When pure, it is limpid and colourless, and closely resembles, (if it be not indentical with) naphtha. Some districts in the metropolis have been lighted by this fluid, burned in lamps particularly constructed for it, by Major Cochrane. The flame in these lamps is very short and extremely bright, and certainly surpasses a common street gas-flame in that respect, if it does not also an Argand burner, supplied by coal-gas.—*Journal of Science.*

Potash from the Stalks of Potatoes.

It was asserted some time since in the French Journals, that 2000lbs. of potash per acre, were obtained from the combustion and incineration of potatoe stalks. From some experiments detailed by Dr. Mac Culloch, in the

Journal of Science, the results per acre are by no means so great; indeed, the Doctor says, there is evidently no temptation for agriculturists to repeat these trials with a view to profit.

On the Application of Chromate of Lead as a Dye.

We noticed this subject in our seventh Number. M. Berthier, (*Annales des Mines*, vi. 137,) observes, that the chromate of lead applies very well on stuffs, and that he has many times repeated the experiment. With subacetate of lead and neutral chromate of potassa, only an orange colour is obtained, not very agreeable; but if the stuffs thus dyed be dipped in acetic acid, they almost immediately acquire a very fine and brilliant yellow lemon colour; in using the neutral acetate of lead in place of the subacetate, a fine gold colour is immediately obtained with the chromate of potassa, but acetic acid cannot give it the yellow lemon colour. These colours are absolutely unalterable by soap and water when cold; at a boiling temperature, they fade a little without any change of tint, but vinegar restores their first brilliancy. Ammonia, makes them of a red orange colour; acetic acid, restores them to their primitive state. Stuffs dyed with chromate of lead, have their colours immediately and completely destroyed, by the subacetate of soda, and by muriatic acid, even when cold.

New Hydro-Pneumatic Blow-Pipe.

To the various improvements which the blow-pipe has received, may now be added another, possessed of considerable advantages. This hydro-pneumatic blow-pipe, is described by Dr. Clarke, in the last number of the

Annals of Philosophy; the improvement originated with Dr. Clarke's servant, *Johnson Tofts*. It is so constructed as to maintain, during two hours, uninterruptedly, a degree of heat capable of melting platinum; and this by propelling the flame of a small wax taper with atmospheric air. The air is propelled from a jet, by the pressure of a quantity of water. The advantages of the old instrument, consist in the operator having both hands at liberty, and in the relief which it afforded, from the fatigue and possibility of injury to the lungs, incident to a protracted restraint on their free action, to which persons using the common mouth blow-pipe were liable. To these advantages, which the new instrument also possesses, may be added the following:—Either common air or any other gaseous fluid may be used for the propelling current, by condensing it in the reservoir, and thus experiments may be made on the fusing powers of the different gases with perfect ease and convenience. The power of entire exhaustion possessed by the new instrument, ensures the operator from any admixture of common air, where oxygen gas or any other gaseous fluid is to be employed. The old instrument, although very useful for bending tubes, or other ordinary purposes, required to be repeatedly restored to action by fresh supplies of air, at intervals seldom exceeding five minutes in the common sized instruments. In the new instrument, a steady flame of two hours continuance may be maintained, of the most perfect shape and uniform temperature, uninterrupted by casual currents, from the pneumatic reservoir. The troublesome interruptions caused by the ejection of water while supplying the apparatus with air which were common in the old instrument, do not happen in the new one. The new instrument may remain unemployed for any length of time, being always ready fo

instantaneous use, and requiring no other preparation than merely that of lighting the wax taper, employed to supply the flame. A trial has been made of the use and powers of this improved blow-pipe, throughout an entire course of public lectures in mineralogy, before the University of Cambridge, with great success. Its usual size is two feet high, two feet long, and five inches wide. It may be made either of copper or tin, and enclosed in a wooden case, which serves as a table, and a rest for the arms. It may be purchased of Newman, in Lisle Street, Leicester Square.

New Sinumbral Lamp.

A NEW *shadowless lamp* has, it is said, been invented and manufactured by Mr. Thomas Quarrill, of Bell-court, Doctors' Commons. This lamp, from the description and drawing of it in the Journal of Science, No. XXII, appears to us very similar to that by Mr. Parker, described in the first volume of this journal, page 346. The oil reservoir is so shaped as to conform with the directions of right lines issuing from the brightest part of the flame, a portion of the light of which is thrown down by a small reflector, upon a circular plate of ground glass which fills the lower part of the lamp, and which is surrounded by the oil vessel. The chimney of the lamp is constructed as usual, and the whole is surmounted by a ground-glass light-distributor, so formed as to do away all shadow from any portion of the lamp, and at the same time not to offend the eye by any want of elegance in shape or dimension.

New Pyrometer.

MR. DANIELL has invented a new pyrometer, which is described in the Journal of Science, No. XXII. This in-

strument, Mr. D. says, is extremely simple in its construction, very manageable in its use, not liable to injury, when injured easily repaired, and which will extend the scale of the thermometer at least to the fusing point of cast-iron. Its sensibility is also very great, considered with regard to the extensive range which it is destined to measure, a change of about seven degrees of Fahrenheit's scale is distinctly indicated by it, while on the other hand every degree of Wedgwood's pyrometer was calculated as equivalent to 130° of the same thermometer. It consists of a tube made of black-lead earthenware; in the inside of the tube is a bar of platinum, immoveably fixed by a nut and screw of the same metal on the outside, and a pin or shoulder in the inside. From one end proceeds a fine platinum wire, communicating with, and passing two or three times round the axis of a wheel, fixed at one extremity of the instrument. It is then bent back and attached to the extremity of a slight spring, by which it is kept extended. The axis of the wheel is 0·062 of an inch in diameter, and the wheel itself is toothed and plays into the teeth of another smaller wheel, which is one-third the diameter of the larger, and carries on its circumference one-third the number of teeth. To its axis is attached an index: the theory of the combination is, that any alteration of the relative lengths of the metal wires and earthen tube will cause the larger wheel to move from the action of the spring, which motion will be multiplied three times by the smaller wheel and measured by the index. The scale is divided into 360°. Instead of passing the fine platinum wire round the axis of the wheel, it has been found better in practice to attach a short silken thread to its extremity and pass that round and fix it to the spring. This instrument may be obtained of Mr. Newman of Lisle-street.

Method of Preventing the Ravages of Moths in Woollen Cloth.

It has been discovered by some officers of artillery at Woolwich, that the clothing returned from Spain, which had been rendered *water-proof* by the common well known processes, remained untouched by moths, whereas in other cases the woollen substances were totally destroyed by these insects.

Block-tin Pipes

Have been lately made by Mr. James Milne, brass-founder, of Edinburgh, which promise to be of considerable utility, for the conveyance of gas, and for other purposes. The chief advantages of the block-tin pipe over any other, are, in its being less liable to be acted upon by gas, and, from the nature of the metal, not likely to oxidate or corrode; from its ductility, it is easily bent to suit the different situations required; and, as the joinings are made with solder, nearly of the same nature as the pipe itself, any blow or strain which the pipe may receive at or near the joint, can do little injury, as both the solder and the pipe will yield together, and never produce a leak as copper-pipe, if put together with soft solder, is apt to do when subjected to the supposed strain; the facility of joining it is also of considerable advantage: any ordinary workman will make a perfect joint in less than two minutes. These pipes may also be joined and soldered while full of water. As this pipe creates no additional expense, its clean and polished appearance, besides the above advantages, gives it a decided preference, where pipes are exposed to view, as they in many cases are.—*Edinburgh Philosophical Journal.*

New Method of saving Lives in cases of Shipwreck, and of Fire.

Mr. John Murray, has found that the *common musket* may be employed with success in propelling an arrow and line to the shore, from the ship or *vice versâ.* The arrow, made of hickory or ash, and loosely fitting the calibre of the musket, is discharged with gunpowder, the charge being rather less than the usual quantity. These arrows are three or four inches longer than the barrel of the musket, and are shod with iron at the point, having an eye, through which the line is threaded. The lower end enters a socket, which must be in complete contact with the wadding of the piece. A soldier's musket or blunderbuss will doubtless serve the purpose better than a fowling-piece, but either will succeed. It is important to observe, that the line never snaps, and the average distance to which the *arrow and a log-line* have been projected, may be estimated at 230; in one case, an iron rod was carried 333 feet. A smaller line would of course be propelled farther; and, when aided by the wind, the distance would be greatly extended; a plumed ruff in this case might surround the shod summit of the arrow, inclining towards the eye. The arrow may also be projected over lofty buildings on fire, and carry a line, attached to a rope ladder, which could be drawn over the roof to the other side, and thus instantaneously afford a fire escape.—*Ibid.*

Cambridge Philosophical Society.

On the Velocity of Machinery.

A paper was read on the 21st. of May last, to this Society, by the Rev. William Cecil, *on a regulator to*

equalize the velocity of machinery.—If two or more wheels be so connected that the velocity of one being increased that of the other shall be increased in the same ratio; and if these wheels be also connected, so that the velocity of the first being increased that of the other shall be increased in a higher ratio; it will be impossible that any increase at all should take place, because it will require the second to move with two different velocities at once. These conditions may be fulfilled by connecting the wheels in the first place by common teeth-work, and in the next place by another toothed-wheel, which slides into different positions as the centrifugal force varies. By this means Mr. Cecil obtains a regulator, which opposes no resistance up to a certain velocity, but which beyond that point, opposes an insurmountable resistance to all increase of velocity; and which can be easily combined with any revolving machine of whatever power and construction, whose rate of going it may be desirable to equalize.

Madder Lake.

THAT lake may be obtained from madder roots has been long known; but a permanent colour in this pigment from madder has also been long a desideratum. It is said that Mr. FIELD, after more than seven years labour, and more than a thousand experiments, has prepared a lake from madder, which in point of brilliancy and strength both for oil and water-colours, has till within a short time nothing comparable to it in the arts. To these qualities is also added the quality of durability. *Lit. Gazette.*

On Physical Power and the acquisition of the Arts and Sciences.

THE following ingenious and sensible observations con-

clude a paper on animal excitability by Dr. KINGLAKE in a late number of the *Medical and Physical Journal.*

Inherent power is incessantly operative; it goes directly to its object; it may be perverted or misunderstood by erroneous speculations of its energies and uses, but it will still prevail; and all the effects which are exhibited in both the moral and physical world may be justly regarded, however unperceived and unknown in numerous instances, as the unremitting exertion of its established influence. Correctly to know, and appropriately to direct this power, forms the rudiments of all science and art, of all natural and acquired intelligence. The regions of knowledge are infinite, but they are not dark and impenetrable; they may be explored and demonstrated by the light of truth, by which alone can be unveiled the minute and latent realities of inherent power, in all the various arrangements of the material universe. To attempt a correct analysis of any species of power, whether anatomical, chemical, mechanical, vegetative or animal, is to undertake an arduous task. An outline of all the main relations of any particular power may be given; yet the more minute bearings, the recondite conditions, on which specific properties and influence depend, are not so directly perceived, and are always objects rather of speculative calculation than of mathematical demonstration.

The great land-marks of general science, in common with their referring more particularly to the animal economy, are as evident as meridian light, and they infallibly supply, in spite of all misapprehension and sophistry, the information that is indispensably necessary for rational existence; they form, indeed, the exhaustless sources of intelligence, incessantly furnished to common-sense inquiries; they are the alphabet of knowledge,—the straight forward course that is at once discerned and understood. But

this vast magazine of knowledge is composed of various parts, all of which are fit objects of distinct research. The examination that disconnects and rejoins these constituent portions of knowledge is instructive, by developing powers, relations, properties, agencies and effects that emanate from circumstances which the decomposing aid of strict analysis could alone reveal. All things which exist are legitimate objects of inquiry, and they should, for purposes of correct and useful intelligence, be investigated in every absolute and relative situation appertaining to them with unsparing scrutiny.

On the Structure and Functions of the Udder of the Cow.

Mr. James White, of Bath, has published a paper on the udder of the cow, in the Medical Journal, which is deserving attention. He informs us that the cow's udder is not a gland, but merely a receptacle for milk which is [illegible] formed in the fourth stomach. That the udder is composed of four distinct receptacles commonly named quarters, each of which is supplied by a distinct milk [illegible]. The two trunks of these vessels may be seen under the cow's belly, when the udder is distended with milk. When the cow arrives at a certain age, and begins to [illegible] towards that state when she is no longer capable of secreting or forming milk, there is a [illegible] gradual obliteration of the udder, so that it becomes [illegible] changed into a fatty matter. Mr. White [illegible] that the result of his researches in the [illegible] economy of the cow's udder, and on [illegible] diseases of cattle, shall be [illegible] volumes. One, a compendium [illegible] the other, Essays on the Structure [illegible] of Cattle, and especially of the [illegible] system of the milch-cow. [illegible]

Voyage of Discovery to the Arctic Regions

THE curiosity of the public has at length been allayed, and in some degree satisfied, by the details contained in *A Journal of a Voyage of Discovery of a North West Passage from the Atlantic to the Pacific, in the years* 1819-20, by Captain PARRY; and in *A Journal of a Voyage of Discovery to the Arctic Regions*, by Mr. FISHER.

These voyages, although necessarily meagre in many scientific details, are yet, to the geographer, the merchant, and the philosopher, of considerable importance. It is not in accordance with our work to notice these publications at large, but a few extracts from them may be useful.

On the 5th of September, 1819, Mr. Fisher informs us, that all hands were called on deck, when Captain Parry told the ship's company that they had last night passed the meridian of 110° W. Greenwich, and thus became entitled to the reward promised by Parliament to the first ship that reached that longitude beyond the Arctic Circle. He at the same time informed them how highly satisfied he was with their past conduct, and stimulated them by exciting their attention to the lasting honours which they would obtain by being the discoverers of the north-west passage. The first anchor let go since the discovery ships on this voyage left England, was in the 110th degree of west longitude.

It has been ascertained by this expedition, that the human frame is capable of preserving a healthy and cheerful existence, in a climate whose mean temperature is nearly the zero of Fahrenheit's scale, or 32° below the freezing point, and where the mercury occasionally descends so low as 54° below zero.

The effects of extreme cold on the human mind are

analogous to those produced by intoxication. Two gentlemen of the expedition, who had exposed themselves to severe frost in the ardour of pursuing a wounded stag, upon arriving in the cabin, looked wild, spoke thick and indistinctly; and it was impossible to draw from them a rational answer to any questions. The mental faculties gradually returned with the returning circulation; and it was not till then, that a looker-on could easily persuade himself that they had not been drinking too freely. To those accustomed to cold countries, this will be no new remark; but we have ourselves experienced similar effects in riding over a mountainous district in severely cold and windy weather in England.

The only affliction which arose from the weather, except that of being occasionally frost-bitten, was, what is called in America, *snow-blindness*. It began by a sensation, like that which is felt when sand or dust gets into the eyes. A solution of sugar of lead removed the complaint in two or three days, and its recurrence was prevented by the use of crape. The scurvy appeared in March and April, but all the invalids recovered in consequence of Captain Parry's having raised some mustard and cress for them in his own cabin. The greatest cold in these regions was quite tolerable in calm weather: the air being, at such times of course, the worst conductor of heat.

The arrangements for the amusements and occupations of the winter, which was passed in these gloomy regions, were most judicious. The crew were mustered in divisions at nine o'clock in the morning, and at six o'clock in the evening of every day in order to see that they were all clean and sober, and to afford an opportunity of examining the state of their bed-places. A weekly newspaper in manuscript was also published; and every

fortnight plays were acted by the officers, some of which were written for the occasion. Hunting parties were also arranged both as amusements, and for supplying the crew with fresh provisions.

On the return of the ships, they had some communication with the Esquimaux, who inhabit an inlet called the river Clyde, which is on the Western shores of Baffin's Bay.

The following is Captain Parry's account of these people:—"Upon the whole they may be considered in possession of every necessary of life, as well as most of the comforts and conveniencies which can be enjoyed in so rude a state of society. In the situation and circumstances in which the Esquimaux of North Greenland are placed, there is much to excite compassion for the low state to which human nature appears to be reduced, a state in few respects superior to that of the bear, or the seal which they kill for their subsistence.

"But with these, it was impossible not to experience a feeling of a more pleasing kind; there was a respectful decency in their general behaviour, which at once struck us as very different from that of the other untutored Esquimaux; and in their persons, there was less of intolerable filth, by which these people are so generally distinguished. But the superiority by which they are the most remarkable, is the perfect honesty which characterised all their dealings with us. During the two hours that the men were on board, and for four or five hours that we were subsequently among them on shore, on both occasions, the temptation to steal from us was, perhaps, stronger than we can well imagine, and the opportunity for doing so by no means wanting, not a single instance occurred to my knowledge, of their pilfering the most trifling article."

Voyage of Discovery to the Arctic Regions.

The following *observations on the Variation of the Needle,* contain the whole of the results given in Captain Parry's work. We have also added *observations* made during the voyage, *on the Dip of the Needle.*

Observations on the Variation of the Needle.

	North Latitude.	West Longitude.	Variation. WEST.	
1819.	° ′	° ′	° ′ ″	
June 19	59 49	48 9	48 38 21	On ice.
26	63 58	61 50	61 11 31	On ice 220 yds. dist.
27	63 44	61 59	60 20 12	On ice [fr. ship.
30	63 26	62 9	61 50 12	On ice 200 yards
30	63 29	62 8	60 55 48	distant.
July 15	70 29	59 12	74 39 0	On an iceberg.
17	72 0	59 56	80 55 27	On ice 200 yds. dist.
23	73 5	60 11¼	82 2 40	
[illegible]	73 3	60 12¼	82 37 30	On ice 250 yds. dist.
24	73 0	60 9	81 34 0	
31	73 31	77 22½	108 46 35	Possession Bay.
Aug. 3	74 25	80 8	106 58 5	Iceberg.
7	72 45	89 41	118 16 27	E. coast of Regent's
13	73 11	89 22¼	114 16 27	On ice. [Inlet.
15	73 33	88 18	115 37 12	
22	74 40	91 47	128 58 17	[illegible] y.
			EAST.	
28	75 9	103 44¼	165 50 9	S.E.p.of B.Martin's
Sept. 1	75 3	105 54¼	158 4 13	On ice. [Island.
2	74 58	107 3	151 30 3	
6	74 47	110 34	126 17 18	
15	74 28	111 42	117 52 22	
Winter Harbour	74 47 13	110 49	127 47 50	
1820.				
June 3	75 6 52	110 27 40	128 30 14	On Melville Island,
7	75 34 47	110 35 52	135 3 55	and during an
11	75 12 50	111 51 54	125 15 22	excursion into
12	75 5 18	111 56 58	123 47 58	the interior of it.
13	75 2 37	111 37 10	126 1 48	
15	74 48 33	111 11 49	123 5 30	
Aug. 5	74 24	112 54	110 56 11	
10	74 26	113 48	106 6 38	
[illegible]	74 25	112 41	111 19 15	
26	74 27	112 11	114 34 45	
Sept. 3	71 16	71 18	91 28 32	W. c. of Davis Str.
7	70 22	68 37	80 59 17	Inl. called R. Clyde.

Observations on the Dip of the Needle.

	North Latitude.	West Longitude.	Dip.	
1819.	° ′ ″	° ′	° ′ ″	
March	51 31	0 8	70 33 27	Regent's Park, London.
June 26	64 0	61 50	83 4 41	Ice, Davis' Straits.
July 17	72 0	60 0	84 14 9	Ice, Baffin's Bay.
31	73 31	77 22	86 3 7	Possession Bay.
Aug. 7	72 45 15	89 41	88 26 71	E. coast of Regent's Inlet.
11	72 75	89 30	88 25 17	On ice.
15	73 33	88 18	87 35 95	N. side of Barrow's Str.
28	75 10	103 44	88 25 58	B. Martin's Island.
30	74 55	104 12	88 29 12	Ice 400 yds. dist. fr. ship.
Sept. 6	74 47	110 34	88 29 91	Beach, Melville Island.
11	76 27	111 42	88 36 95	Melville Island.
1820.				
July 18	74 47	110 48	88 43 5	Observatory, Winter Har.
Sept. 17	68 30	64 21	84 21 42	Ice, Davis's Strait.
28	51 43	0 14	70 33 5	Near London.

We have been favoured with the perusal of a letter received from the Northern Expedition, which left England in the spring. It is dated on board His Majesty's ship Fury, Hudson's Bay, 26th June, and states that the ship's company are all well, in latitude 61° 40′ N. and longitude 53° W. waiting for a fair wind, in order to proceed up the eastern channel of Repulse Bay. The living animals and stores of salt provision, are considered to be sufficient for three years supply.

FRANCE.

The *Royal Academy of Sciences* at Paris, have proposed the following prize questions for 1823:

To determine by precise experiments, the causes either chemical or physiological of animal heat. The prize, a gold medal, value 3,000 francs. The memoirs are to be sent in, before July 1, 1823.

The *Societe Medicale d'Emulation*, proposes the following prize questions: the memoires, to be written in French or Latin, are to be sent before August 1, 1822. The value of the prize, 500 francs.

What are the disposition and structure of the system of organ called the nervous ganglions, of the organic life, sympathetic nerve, great intercortal, trisplanchique, &c.?

What are the functions of this system of organs?

And, as far as is known, what are the diseases in which it is essentially affected?

Freycinet's Voyage of Discovery.

THE *Royal Academy of Science* at Paris, transmitted on the 7th of May to the French Minister of Marine and the Colonies, a *Report on the Voyage of Discovery and Circum-Navigation*, undertaken by Captain FREYCINET, in the URANIE corvette. The manuscripts of the expedition, which are deposited with the Secretary of the Academy, form thirty-one quarto volumes.

The objects of the voyage are detailed under the heads of *Itinerary Observations on the pendulum, Magnetism, Geography, Hydrography, Meteorology, Natural History, Zoology, Entomology, Geological Collections, Historical Narrative of the Voyage.*

The principal objects of the expedition, were to investigate the form of the globe, and the elements of terrestrial magnetism. But, meteorology, geography, &c. were of course, to be also attended to. M. FREYCINET, took with him four pendulums, which, previously to the departure of the expedition, were examined in Paris, in 1817, by M. M. Freycinet, Lamarche, Mathieu, and Arago. Thus, a term of comparison was procured for all the analogous observations which were to be made in the two hemi-

spheres, and, what was no less indispensable, the means of ascertaining on the return, whether during the voyage, the shafts or knives had undergone calculable alterations. Two of these pendulums were made of copper, with cylindrical shafts; another of the same metal, with a flat shaft; and another, having a shaft of varnished wood, a flat and very heavy copper lens, and a knife of a particular alloy, very hard, and in a very slight degree susceptible of oxidation. The temperature has been every where determined with the same thermometers, which, before the departure of the expedition, were carefully compared with those of the Observatory of Paris.

At the Cape of Good Hope, where Lacaille measured the absolute pendulum in 1752, M. de Freycinet determined the number of the oscillations of his four invariable pendulums. The calculation which has been made from these observations, do not confirm the consequence which was deduced from the operations of Lacaille, respecting the dissimilarity of the two hemispheres.

The observations on the three copper pendulums, made at the Isle of France, and particularly those made at Port Jackson, furnish also valuable information on this question.

The observations of M. Freycinet would have been imperfect, had he not determined under the equator, or at least very near the line, the number of the oscillations of his pendulum: at Rawak, a little island depending on New Guinea, and situated in 1½ degree south latitude, the observations on the four invariable pendulums were made; with which all analogous observations must be compared by those who wish to calculate the flattening of the two hemispheres. This flattening, whether it be deduced from the different lengths of the absolute pendulum, or from the number of oscillations performed in twenty-four hours by a pendulum of invariable length in different places, is de-

termined with the more precision in proportion as their places are different in latitude. In such an investigation it is easy to guess the value of observations which might have been made at Cape Horn. But unfortunately, a violent storm and subsequent shipwreck prevented the fulfilment of this part of the expedition.

Relative to *magnetism*, the report observes, the expedition would very imperfectly have answered the expectations of the Government and the Academy, had it brought back only such magnetic observations as were made while the vessel was in port, The curves along which the declinations have the same value, and the curves of equal inclination and equal intensity present on the globe forms so singular, that it is scarcely allowable to determine certain points by interpolation. To multiply observation is, therefore, the only means of obtaining positive results on this subject. The journals of the expedition contain, for every day on which the sun was visible, namely, from the departure from Toulon to the arrival at Havre, a numerous determination of declinations. The measures of inclination made by Mr. Freycinet decidedly prove the singular inflexion of the magnetic equator in the South Sea, which is deduced from the observations of Captain Cook. The detailed discussion of the obsevations will shew whether their inflexion has invariably the same extent, or whether it has changed with respect to longitude.

Besides the pendulum, M. Freycinet carried with him five chronometers, which were daily compared together during the whole of the voyage, by the series of horary angles.

In the passage from the Sandwich Islands to Port Jackson, M. Freycinet discovered, on the east of the Archipelago of the navigators, a small island, to which he

gave the name of *Rose Island.* The situations of several small islands, very remote from the great masses of land, were determined during the same voyage. These islands will henceforth form reconnoitring points at which vessels, having to cross the great ocean may touch, as if by gradation, to verify their longitudes.

This voyage has rendered no less essential service to the history of animals than to the sciences of astronomy, natural philosophy and geography. Notwithstanding eighteen boxes were lost at the period of the shipwreck, the collection brought home by the expedition, comprises 25 species of Mammalia, 313 Birds, 45 Reptiles, 164 Fish, and a great number of Mollusca, annelidæ, polypi, &c.; the number of skeletons amount to about 30; among them is a man of the race of the Papoos, a Tamandu, (*myrmecophaga Tamandu*), a head of adult Tapir, &c. The collection includes 4 new species of great Mammalia, 45 of birds, among which are three new genera; upwards of 30 reptiles, and about 120 of fish. The latter, which are preserved in alcohol, are the more valuable, since very few were previously known, and with these we were only acquainted by means of ill prepared skins, or the incorrect drawings of Commerson.

Besides the objects of natural history collected by this expedition, a considerable number of drawings of birds, fish, snails and insects, were made by M. Arago, draughtsman attached to the Uranie.

The dry plants collected during the voyage, comprise about 3,000, 200 of which at least are unknown. The plants obtained in the neighbourhood of Port Jackson, on the Blue Mountains of New Holland and at the Sandwich Islands, are in an excellent state of preservation and present many novelties.

The report, of which the above is a short, and indeed incomplete abstract, is signed by M.M. De Humboldt, Cuvier, Desfontaines, de Rossel, Biot, Thenard, Gay-Lussac, and Arago.

GERMANY.

A useful Botanical work has just been published, intitled *Nomenclator Botanicus enumerans ordine alphabetico Nomina atque Synonyma, tum Generica tum Specifica et a Linnæo et recentioribus de re Botanica scriptoribus, plantis phancrogamis imposita.* Auctore Ernestic Steudel, M.D. All lovers of botany will doubtless be much interested by the publication of this work, which contains a catalogue of all plants known and described up to the latest period, about 3400 genera, and 40,000 species; with an accurate indication of the authors, and of all the denominations assigned to them since the time of Linnæus.

AMERICA.

United States.

We have been favoured by a friendly correspondent from Philadelphia with the following notices.

A Mill without Water.

Mr. John Telford, of Tenesee, has obtained a patent from the United States, for an improvement in a vertical wheel, to be worked by the weight and action of a horse or horses, or any other animal that has weight and action; on a plain and simple plan, so that one large horse can grind corn, &c. with a pair of stones four feet in diameter; or two can perform the operation of sawing, equal to any water-mill.

New Method of Watering the Streets.

An engine has been just exhibited at Philadelphia for watering the streets, of a novel construction. It consists of a vessel which contains about twenty hogsheads of water; it is filled by a leather hose, communicating with the hydrauts in the street, and drawn by three horses; a large spout, like that of a watering-pot, is attached to the carriage behind; this spout is moveable, so that a whole street may be watered by the carriage once passing through it, and as fast as the horses go—about three miles an hour.

Repeating Musket.

It is said, that a repeating musket has been invented in this country, which is calculated to discharge eight single balls in regular succession, within the space of sixteen seconds. This musket has two locks; one at the usual place, the other, about half way down the barrel. The balls are perforated, and a small fuse passes through each, which is lit by the cartridge to which it is attached. The priming is, in the first instance, set on fire by the lock fixed on the barrel, the trigger of which is drawn by a wire, and the charges in the chamber of the gun may be kept in reserve.

Self-moving Machine..

A self-moving machine, as a time-keeper, has been invented here, and there is no doubt but it will continue to go as long as the materials, which are of wood, iron, and brass, endure. The principle is a very simple one. We wish our correspondent had explained it.

New Patents Sealed in 1821.

To Aaron Manby, of Horsely, near Tipton, Staffordshire, iron-master, for certain improvements in the making and manufacturing of steam-engines.—Sealed May, 9th. 6 months for inrolment.

To Robert Paul, of Starstar, Norfolk, gentleman, and Samuel Hart, of Redenhall with Harleston, in the same county, painter and gig-maker, for a certain improvement in springs applicable to various descriptions of carriages.—Sealed May 17th.—6 months for inrolment.

To Sir William Congreve, of Cecil-street, Strand, Middlesex, Bart. and James Nisbet Colquhon, of Woolwich, Kent, Lieutenant in the Royal Artillery; for certain improvements in the art of killing and capturing of whales and other animals to which such means are applicable.—Sealed June 7.—6 months for inrolment.

To John Vallence, of Brighton, Sussex, Brewer; for improvements on a patent granted to him on the 20th of June last, for a method and apparatus for freeing rooms and buildings (whether public or private) from the distressing heat sometimes experienced in them, and of keeping them constantly cool, or of a pleasant temperature, whether they are crowded to excess or empty, and also whether the weather be hot or cold; and the said John Vallence hath invented or discovered improvements relative thereto, and in some cases with, and in some cases without, a gas or gases extended, or additional applications of the principles, or of some or one of the principles (either of construction or operation) thereof, as applicable to purposes other than what he first contemplated.—Sealed June 19th.—6 months for inrolment.

To William Church, of Threadneedle Street, London,

Gentleman, for an improved apparatus for printing.—Sealed July 3d.—6 months for inrolment.

To James Simpson, of the Strand, Middlesex, surgical instrument-maker, for an improvement in the manufacture of snuffers.—Sealed July 3d.—2 months for inrolment.

To William Coles, of New-street Square, St. Bride's, London, mechanic, for braces or instruments for the relief of hernia, or ruptures.—Sealed July 5th—6 months for inrolment.

To Robert Dickinson, of Great Queen-street, Lincoln's Inn Fields, Middlesex, Esq., for certain improvements in the construction of vessels or craft of every description; whereby such vessels or craft may be rendered more durable than those heretofore constructed for the purposes of navigation.—Sealed July 14th.—6 months for inrolment.

To Samuel Cooper, engineer, and William Miller, gent. both of Margate, Kent, for certain improvements on printing machines.—Sealed July 17th.—6 months for inrolment.

To David Barclay, Broad-street, London, merchant, for a communication made to him by a certain foreigner, residing abroad, of an invention of a spiral level, or rotary standard press.—Sealed July 26th.—6 months for inrolment.

To John Richard Barry, of the Minories, London, for certain improvements on, and additions to wheeled carriages.—Sealed July 26th.—6 months for inrolment.

Thomas Barker, of Oldham, Lancaster, and John Rawlinson Harris, of Winchester-place, Southwark, Surry, hat-manufacturer, for certain improvements in the method of clearing hats and wools used in the manufacture of hats from hemps and hairs.—Sealed July 26th.—6 months for inrolment.

LONDON
SHACKELL AND ARROWSMITH, JOHNSON'S COURT, FLEET STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XI.

Recent Patents.

To ROBERT FRITH, *of Salford, Lancashire, for improvements in the method of Dyeing and Printing various colours, so as to fix, or make the same permanent, or fast, on Cottons, Linens, Silks, Mohair, Worsted and Woollens, Straw, Chip and Leghorn.*

THE following preparations, or mixtures of metals, solutions, and mordants, are the materials used in these improvements in dyeing and printing the various colours hereinafter mentioned; and, as the same preparations or mixtures will be continually referred to in the description of dyeing and printing, for the purpose of better understanding the particular mixture of metals, solution, or mordant, referred to, they are divided under numerical heads.

METALS.

No. 1. Take three pounds of lead and one ounce of silver, and melt them together.

No. 2. Take six pounds of block tin and one ounce of silver, and melt them together.

SOLUTIONS.

No. 1. Take muriatic acid and add metal No. 1. to it for four or five days, then give it as much of metal No. 2 as it will take during the same space of time, then add as much copper and Roman vitriol as it will take during the same period.

No. 2. Take nitric acid one gallon, and sal ammoniac four ounces, mix it with the acid, then give it metal No. 2 till it begins to thicken, and let it stand four or five days before it is fit for use.

No. 3. Take nitric acid and give it metal No. 1, and copper turnings, or Roman vitriol alternately, till it begins to thicken, let it stand four or five days before it is fit for use.

No. 4. Take nitric acid and give it metal No. 1 and iron, or sulphate of iron alternately, till it begins to thicken, then let it stand four or five days before it is fit for use.

To make a MORDANT *from the above solutions.*

No. 5. Take four parts of solution No. 2, and one part of solution No. 3, with two parts of solution No. 1, and mix them together, then add one part of water to four parts of the mixture. Next add one pint of strong liquor from sumach, galls, myrobalans, or valonia, and add alum after the rate of four ounces to one gallon.

The following forms are given by the Patentee for dyeing the respective colours upon the several materials before-mentioned, by means of the preparations above-numbered, to the figures of which references are made.

To dye Yellow and Straw colour.

Cotton or silk is to be passed through the mordant

No. 5, then washed, and the colour raised with weld and bark, or fustic; after which the goods are to be washed and dried. Then they are to be passed through a strong red liquor, or a solution made from two pounds of alum, and one pound of sugar of lead, to one gallon of water, fermented with two ounces of pearl-ashes. The goods are then to be again washed, and the colour raised as before with weld and bark, or weld and fustic, after which the goods are to be washed and dried.

Orange and Red.

Use the same process as for straw-colour and yellow till you come to the second raising, for which purpose use weld and madder-root, or crop-madder, or fustic and madder. Then wash off and dry; but for the red use more of the madder-root than for the orange according to the required shade.

Green.

On cotton or silk dye the goods indigo-blue, light or dark as desired, and use the same process as for yellow.

Pink.

On cotton or silk pass the goods through the mordant, No. 5, then wash them and raise with strong galls, sumach, myrobalans, or valonia liquor. Wash off and dry the goods, after which pass them through the mordant No. 5, then wash again and raise the colour with cochineal.

Scarlet or Red.

For red or scarlet, on cotton or silk, pass the goods through the mordant No. 5, then wash them and raise with strong galls, sumach, myrobalans, or valonia liquor; then wash and dry them. Again pass the goods through the mordant No. 5, and wash off, then raise with strong galls,

sumach, myrobalans, or valonia liquor, and pass them through the mordant a third time; after which they are to be washed off and raised with cochineal.

For scarlet on cotton, pass the goods through the same process as for red, with the addition of raising them one time more, and passing them through the mordant again. Then wash off and raise with cochineal as before.

Black.

To dye black on cotton-yarn, take one gallon of iron liquor and add two ounces of verdigris, boil them together. Then dye the yarn a middle indigo-blue, wash off and dry. After this pass it through sumach, gall, or valonia liquor, and then through the mordant No. 5. Wash it well off, and raise with gall, &c. as before, and wash and dry the yarn. Then pass it through the before-mentioned iron-liquor, mixed with an equal quantity of water, then dry and afterwards wash off; dry again and raise with madder and a little gall-liquor, dry again, wash off and pass it through the diluted iron-liquor once more, and raise again as before.

Olive and Drab.

For cotton, yarn and cloth, pass the goods through mordant No. 5. and raise with sumach, gall, or valonia liquor, then wash and dry. For olive, pass the goods through the diluted iron-liquor before-mentioned in dyeing black; but the drab will require a weaker solution of the iron-liquor (viz.) six waters to one of iron-liquor. After washing and drying, raise with weld or a little madder and gall.

Crimson, Brown and Purple.

On cotton or silk pass the goods through mordant No. 5. and wash off, then raise with a weak liquor from galls, sumach, myrobalans, or valonia; then wash off and dry, afterwards pass it through a mixture of red-liquor and

iron-liquor consisting of two parts of red, and one of iron. For dark purple add six waters to one of this mixture; but for the light shade take fifty waters to one of this mixture; then pass the goods through it, dry and wash them off, after which raise with cochineal or madder, or both of them mixed.

Crimson and Garnet.

For these colours take less of the red-liquor, and more of the iron-liquor than before (viz.) one pint of the red to one gallon of the iron, then raise with cochineal or madder, or both, and wash off as before.

Brown.

For brown use the same process as for crimson, except in the proportions of red and iron-liquor, which will be one quart of red to one gallon of iron-liquor. For woollen and mohair the same process is adopted as before described for the various colours of silk.

Yellow.

In chip, straw, or Leghorn, to produce yellow mix four parts of solution No. 3, then steep the chip, straw, or Leghorn in the said mixture during two hours, after which well wash it. Then raise in weld and American bark, [Quercitron ?] or fustic, then wash and dry.

For Printing on Cotton.

Purple.

Take solution No. 1. then boil logwood-chips in water till it stands six by Rochetta's hydrometer; then boil four ounces of cochineal in one gallon of water till it is reduced to half; then put half a pound of madder to one gallon of water, add two ounces of ground galls, and let them stand four or five days. Then take five quarts of the logwood-liquor, one quart of the cochineal-liquor, and one quart of the madder and gall-liquor, put them together and thicken with starch, flour, or gum [illegible]

About four pounds of starch to one gallon of this mixture will suffice; but when gum is used, add to the mixture till it is thick enough to work; then take six parts of solution No. 1, one part of solution No. 2, and one of solution No. 3, and mix them together, adding alum after the rate of one ounce to the gallon. Then to one gallon of the thickened colour add one quart of the said mixture or solution. When the goods are printed and ready for raising, dip them in very weak oil of vitriol and water, and wash off thoroughly.

Crimson.

For printing this colour on cotton, put two pounds of sugar of lead, four pounds of alum, six ounces of cream of tartar, and four ounces of ground galls to one gallon of water, and stir them well for two days. Then ferment with two ounces of pearl-ashes and stir them at times during twenty-four hours; the colour may be then thickened with gum Senegal, and to one gallon of it add half a pint of solution No. 2., then print it, and after three or four days dung and clean the goods very well. Then give them a decoction of cochineal and madder after the rate of four ounces of each to a piece of cloth twenty-eight yards long. Then clean with a little bran not too strong nor too long in the operation.

Chemical Red.

To print this colour on cotton, woollen, or silk goods, take half a gallon of solution No. 2, and one quart of solution No. 3, and one pint of solution No. 4, mix them together and add one pound of madder and two ounces of ground galls, stir them well repeatedly during twenty-four hours; then take the clear liquor from them and put to it as much cochineal as it will dissolve during twenty-four hours being agitated. After this take the clean liquor off and thicken it with gum tragacanth till it is fit

for use. When the goods have been printed forty-eight hours, wash them in clean water, except the woollen, which are to be steamed two hours without washing.

Chemical Yellow.

To print this on cotton cloth, boil American bark, [Quercitron ?] Turkey yellow berries, or French berries together, or separate, till it stands at four Rochetta's hydrometer, then thicken one gallon of the decoction with gum tragacanth, starch or flour, and add to it one pint of solution No. 1, then print the cloth and dry it with a very moderate heat for twenty-four hours, and then rinse off in water.

Chemical Green.

To print chemical green on cotton cloth, take solution No. 1, and add fine ground Prussian blue till it becomes well thickened, stirring it well during three weeks; then take one pint of the colour employed for the chemical yellow and mix with it one part of the blue just mentioned, which are to be thickened with gum tragacanth till fit for use. With this print the cloth, and after twenty-four hours drying rinse it well in water.

The following description relates to the printing of red upon yellow silk; that is dyed and raised in the manner described, under the head of yellow and straw colour.

Preparation A.

A strong decoction of cochineal is boiled until it stands at four by Rochetta's hydrometer; then to a part of this decoction is added alum, or a little of the mordant No. 5, till it breaks. After it is well settled filter it through fine cotton or woollen cloths. To one gallon of this decoction add one pound of alum, one pound of cream of tartar, and four ounces of verdigris; or, instead of the verdigris, three ounces of blue vitriol, the mixture being kept

hot till all is dissolved. Then put as much filtered lake to it as will produce the required colour, and thicken with gum Senegal.

Preparation B.

Take a strong decoction from Brazil-wood to stand four by Rochetta's hydrometer, and use it the same in every other respect as the cochineal described above, under the preparation A.

Preparation C.

Make a strong decoction of peach-wood to stand four by Rochetta's hydrometer, and treat it in every respect the same as A and B.

An equal quantity of the above thickened colours A, B, and C, is then used to print with. If a different shade is required, mix two parts of C to one of A, or three parts of B to one of A, and when the goods have been printed for twenty-four hours then steam them and wash off.

To print black along with the red, on the same yellow silk, boil logwood in water till it stands six by Rochetta's hydrometer, then thicken with gum Senegal, and to one gallon of the thickened colour add one pint of solution No. 4, and half a pint of solution No. 3, then print, dry, steam and wash as above.

To dye nankeen-colour on cotton, yarn or cloth, take mordant No. 5, and add one half water to it, then pass the yarn or cloth through it, and afterwards wash the goods well, and raise in a decoction made from galls, valonia, sumach, myrobalans, alder-bark, nankeen-bark, mahogany-bark, or mahogany saw-dust. Then pass the goods again through mordant No. 5; then wash off and pass them through warm soap and water, after which they are to be dried.

We have given the different processes described in this

patent as nearly as possible, consistent with the limits of our work, in the words of the patentee; and although an expert artist may possibly gather from them some useful information, yet we have greatly to complain of the obscurity and incorrectness of many of the directions. In solution No. 1. we are directed to take *muriatic acid*, but not a word is said about the *quantity*. In solutions Nos. 3, and 4, *nitric acid* is mentioned, but not a syllable about the *quantity*. In solution No. 5, *strong liquor* from sumach, galls, myrobalans, or valonia, is ordered, but not a syllable is said about the mode in which this liquor is to be made. There are many other obscure and unintelligible directions besides these, which we do not think worth our while to notice. We cannot, however, avoid observing, that the whole is drawn up in a very illiterate and unscientific manner. We wish patentees would attend to our repeated admonitions on this subject. We believe that there is not an ingredient mentioned throughout the whole of this patent which has not been previously employed in dyeing; and we are at a loss to conceive in what respect the different *combinations* of materials, none of which strike us as being novel, are made so as to entitle the patentee to any exclusive privilege.

Inrolled, April, 1821.

To JAMES FOSTER, *of Stourbridge, for certain Improvements in the Manufacture of Wrought or Malleable Iron.*

THIS improvement is stated to "consist in enclosing a bar of iron, of any figure that may be desirable, within repeated layers of iron of a suitable thickness and of a cylindrical, octagonal, or any other suitable figure, so

that each layer shall consist of only two pieces, and so arranged, that the joints or seams of each layer of iron shall be intersected or covered by the solid part of the succeeding layer. These layers are repeated as often as may be requisite to make the pile of the size and weight required, and after it is so formed (of whatever figure may be deemed necessary to the purpose), it is then to be heated in the customary manner, and rolled or hammered to the size and description of iron required."

Inrolled, August, 1821.

Although we are by no means advocates of long and verbose specification, when the essence of the invention might be contained in a nut-shell, yet the above laconic description is certainly verging upon the extreme of brevity. In a specification, which ought to explain certain improvements of a particular manufacture in a manner so clear that any ordinary workman shall be able to perform from the description alone, we might expect to have something more of the process than merely "*enclosing a bar of iron,*" &c. "*within repeated layers of a suitable thickness,*" &c. By what means the bar is to be enclosed, does not appear, though the layers are to be "*repeated as often as may be requisite,*" that is, piled one upon another. Are they to be laid on cold, and bound round the bundle, or welded together piece after piece? this we are left to conjecture, for *after it is so formed,* we are told "*it is then to be heated in the customary manner,*" &c. It is stated, that each layer shall consist of *only two pieces*, that is, if we understand rightly, two pieces of iron, intended to encase the original bar, must be so moulded or shaped, as to lap round and completely encompass the bar, whether it be round, square, octagonal, or otherwise, the edges meeting each

other; and the next layer is to be so placed upon the preceding, as to cover or block joints. We think there would have been no impropriety in stating the object or purpose for which this invention is proposed.

To CHARLES NEWMAN, *of Brighton, in the County of Sussex, for a new and original Invention in the Construction of the Body of a Stage or other Coach, by placing a certain proportion of the Outside Passengers in the Centre of the Carriage, and a proportion of the Luggage under the same, producing thereby Safety to the Coach and Convenience to the Passengers.*

THE specification of this invention, after expatiating upon the fatal accidents which frequently occur by loading the roofs of stage coaches, and thereby rendering them top-heavy, goes on to state, that "this improvement on stage coaches is to do away with the necessity of carrying either luggage or passengers on the roof, and to provide for the outside passengers, a comfortable and convenient seat, in the form of a barouche, attached to the back part of the body; which contains the inside passengers in a large roomy body, more comfortable than any stage coach ever offered to the notice of the public; and by placing the greater number of persons, as well as the luggage, on the higher wheels, with the wheels the usual width on the ground, this coach is enabled to travel safer than any other coach.

As we are perfectly unable to point out the peculiarity of this coach, or to discover in what particular it is novel or different from other *safety coaches*, emphatically so called, we shall refer our readers to the Patentee's own

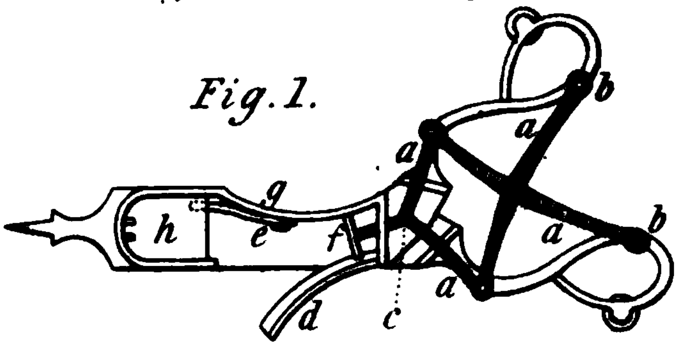
words, in describing the different parts of his invention. First, there is "the coachman's seat, with room for one outside passenger — a small boot for luggage — a full-sized roomy body, to carry four inside passengers, with steps to fold over the fore-wheel, which render the getting in and out easy and not liable to dirt the passengers' clothes—a complete barouche body, to hold eight persons, enclosed with folding doors, and steps; these seats are in every respect as comfortable as the inside of any coach, and perfectly safe for the infant and infirm—a step to get in, which totally prevents the common unpleasant necessity of climbing over the wheels—a luggage box, which opens from the back part, and is capable of containing more luggage than can possibly be carried in any other form, being under the whole of the barouche, and being under cover, lock and key, free from wet or damage, and nearest to the ground, serves to keep the carriage upon a level;—also a dickey, to hold three passengers, upon a level with the driving-box."

It is further said, "though I conceive myself to have been the sole and only inventor of the safety coach, that such is not what I call the principle of my present invention, but that the construction of the several parts combined together, the improvement in carrying passengers and luggage both with safety, in not upsetting the carriage by being top-heavy. And I do declare that I do not make claim to several parts of the carriage separately, but my invention consists in them jointly and in their junction."

Inrolled, August, 1821.

Simpson's. Snuffers.

Fig. 1.



Coates's. Hydrostatic Ballance.

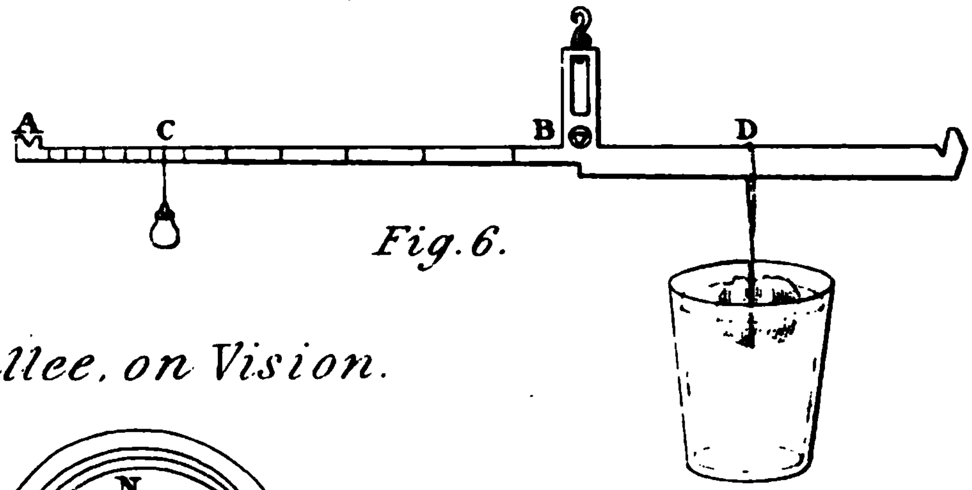
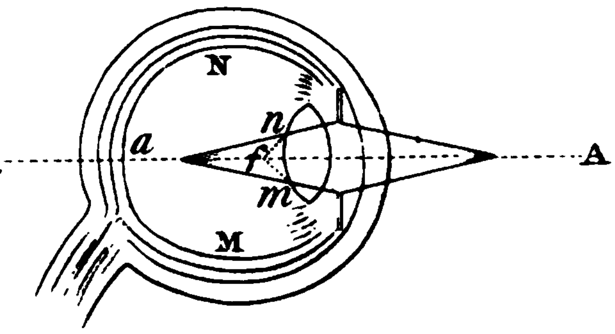


Fig. 6.

Vallee, on Vision.

Fig. 7.



Machell's. Lamp.

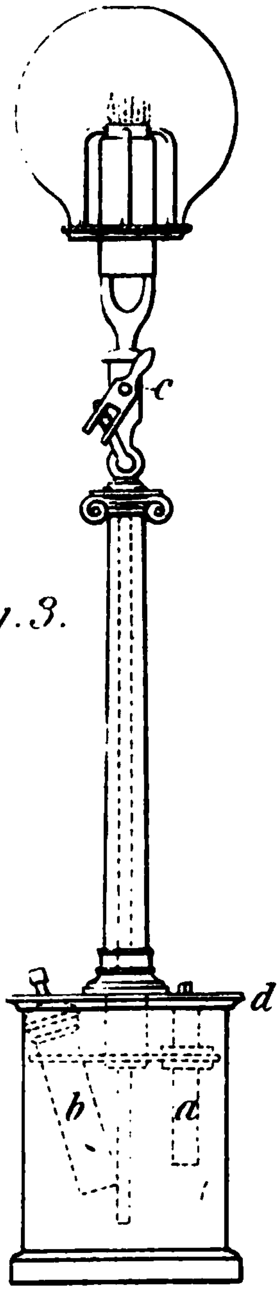


Fig. 3.

Fig. 4.

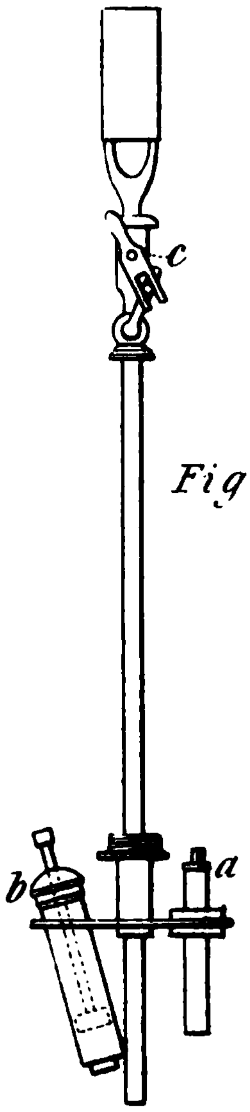
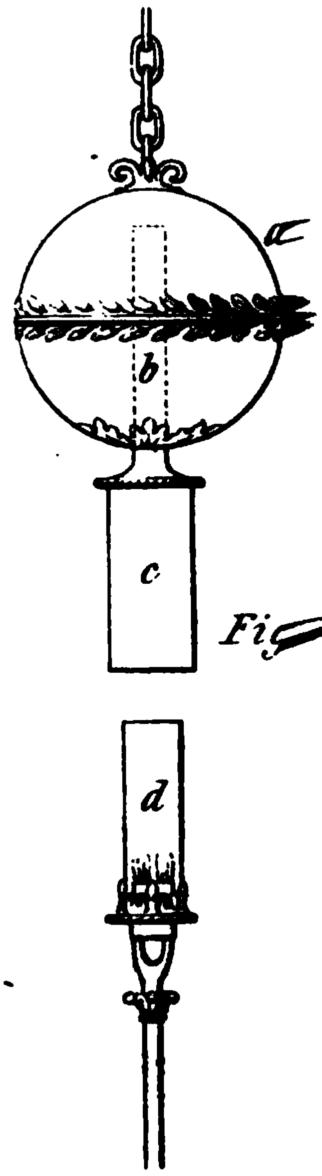


Fig. 2.

Debaufer's. Perd



Fi

Wm Newton. del.

G. Gladwin. sculp.

To James Simpson, *of the Strand, London, for an Improvement in the Manufacture of Snuffers.*

This improvement consists in attaching compound levers to the handles of snuffers, by the closing of which a scraper is projected along the box or chamber, and by means of this scraper, the snuff, immediately after it is cut, is forced into a receptacle which prevents it from falling out when the chop of the snuffers is again opened.

A representation of this improved snuffer is shewn in Plate XV. fig. 1; the top of the chamber being removed for the purpose of exhibiting the action of the parts within: *a a* are the compound levers, connected together by pivot joints, their extremities being attached to the bows of the handles at *b b*, and to the rod of the scraper at *c*. By bringing the handles together, the moving chop *d* cuts the wick off against the straight edge, when the snuff immediately falls into the chamber *e;* at the same time, by the closing of the bows, the compound levers project the scraper *f* forward, which, in its passage, raises the lever *g* for the purpose of lifting the cap, or cover, *h*, while the scraper forces the snuff into the receptacle below, whence it may be removed by means of a slide at bottom when occasion requires.

The novelty claimed in this patent is the *scraper*, and the method of moving it forward by means of the *compound levers:* the various parts may be made of steel, silver, or any other suitable material, and their form or fashion be varied at the will of the manufacturer. One advantage in this construction of snuffers is, that, having no spring or springs about them, they are not capable of being put out of action by any trifling accident.

Inrolled, September, 1821.

To ALEXANDER LAW, *of the Commercial Road, London, for an Improvement in the Form of Bolts and Nails for Ships, and other Fastenings.*

THIS improvement consists in giving to the bolts and nails used for ships' fastenings such a figure or form, that when once driven home into the wood, they cannot start by any contraction of the metal under a cold temperature, or work themselves out by jars or strains. The form of the bolt proposed, is that of a prism of four, five, or a greater number of sides; which prism is to be twisted so as to form the worm of a screw, or, as the Patentee expresses himself, "making the sides and angles to wind round the axis of the bolt or nail in a screw form, so that the said bolt or nail, when in the act of being driven into a hole of proper size, shall revolve on its axis as it is made to advance by the force applied to it."

It is presumed, that the pieces fastened together by bolts of this twisted form, will hold much more securely than by the ordinary straight bolts heretofore used in ship-building, as the improved bolt cannot be drawn by any of the common strains to which such fastenings are exposed, without absolutely tearing out a portion of the solid substance of the wood.

In describing a process of making these improved bolts, it is suggested, that they may be formed by welding into polygonal rods, or prisms of as many sides and angles as may be required, any portion of whioh rods, if equally twisted, would assume a screwed appearance, and have as many threads as there were angles originally given to the piece of rod before it had been twisted. Such a piece of polygonal rod, when thus twisted, may be considered a bolt or nail of the improved form.

It is, however, to be observed, that the invention relates only to the form of the bolt, and not to the mode of manufacturing. This may be made by the above, or any other process calculated to effect that form of bolt, which process is not claimed or considered to constitute any part of the invention.

The said rods, after receiving their polygonal and screwed form, are to be cut into pieces of such length as may be required, and headed, when heads are found necessary, by the common process for heading bolts and nails heretofore practised.

Inrolled, September, 1821.

To Aaron Manby, *of Horseley, near Tipton, Staffordshire, for certain Improvements in the making and manufacturing of Steam Engines.*

These improvements (which do not appear to be in the *making or manufacturing*, but in the form and construction of the steam-engine) consists of two parts, first, in rendering the cylinders capable of oscillating; and secondly, in generating the steam by means of tubes filled with heated oil.

The patentee describes the usual construction of steam-engines, which have their cylinders fixed, as objectionable, from the circumstance that, in order to convert the alternating motion of the piston into a rotatory motion, several rods or bars are connected together for the purpose of effecting what is termed a parallel action, which operate upon cranks and wheels with considerable confliction of machinery, much friction, and a consequent loss of power. This improved construction of the steam-

engine is intended to produce a rotatory motion by the direct action of the piston-rods, which are to be coupled or immediately connected to the cranks of the main shaft.

In this engine the cylinder (or cylinders when more than one is used) is supported by lateral pivots upon which it oscillates on its centre of gravity, for the purpose of accommodating its position to the direct ascent and descent of the piston-rod, the rod being of necessity carried out of the perpendicular by its connection at top to the crank of the shaft. By this contrivance a farther simplification of the mechanism is effected in dispensing with the geer usually employed for working the induction and eduction slide-valves, which, upon the improved principle, are made to open and shut by the oscillation of the cylinder.

It is stated (but the method not described) that, by means of a cock, the motion of the engine may be reversed, which will render the OSCILLATING STEAM-ENGINE particularly applicable to propelling vessels on water, to working mines, and to all other operations of an alternating description." These engines may have several cylinders when very considerable power is required; but, in general, two cylinders only are to be preferred, which will balance or equalize the motion of the shaft, and render a heavy fly-wheel unnecessary. By admitting the steam to the whole set of cylinders, where many are combined upon the above principle, an engine of extraordinary power may be produced; or, by cutting off the communication of the steam from one or more of the cylinders, an engine of small force, or indeed of any required power, may be employed.

The second part of the invention (viz.) a mode of generating steam by means of tubes filled with heated oil, is proposed as being more safe and economical than the

ordinary description of boiler. It consists of an apparatus, in which the quantity of water required by the steam-boiler is considerably reduced, and at the same time the heated surface by which the steam is generated greatly increased without at all exposing the steam-vessel to the action of the fire, and hence not subjecting it to be burnt or worn.

It is well known that oil and other fatty matters are capable of being raised in temperature far above that of boiling water, and without undergoing decomposition; this property in oil, however, the patentee observes, has never before been taken advantage of in working the steam-engine, and therefore by him is made to form the leading features of this part of the improvement. The construction of the copper or boiling apparatus is shewn at Plate XIV. fig. 1, and consists of an oblong vessel or boiler *a*, of wrought iron set in brick-work, under which the fire is placed. This vessel is intended to contain a portion of oil or other fatty matter about 12 inches deep, which is to be heated to the temperature of 300 Farenheit; *b*, *b*, is the steam-vessel, a cylinder of wrought iron nearly filled with water, within which a number of pipes or tubes, *c*, *c*, *c*, *c*, *c*, are placed, and bent or coiled so as to present the greatest possible surface to the surrounding water. Through these tubes the heated oil is made to flow in a continued current by means of the pump *d*, which may be worked by hand or be connected to a moving part of the engine.

The oil heated as above-described in the boiler *a*, by the action of the pump is raised up the pipe *e*, into the chamber *d*, and thence is forced up the pipe *f*, and made to flow through the tubes *c*, *c*, *c*, *c*, *c*; which tubes being surrounded by water, the heat is absorbed from the oil in its passage, and the water rapidly converted into

steam. When the heated oil has performed its circuit through the tubes *c*, *c*, *c*, *c*, *c*, it discharges itself down the pipe *g*, into the boiler again, and there receives a restoration of the heat which it has parted with in its passage through the steam-vessel. By enlarging the tubes or augmenting their number, the steam may be generated with any degree of rapidity. By regulating the temperature of the oil the pressure in the steam-vessel is at all times under controul, and hence an explosion of the apparatus is impossible.

It is stated that by this improved mode, steam at a high pressure may be used without the possibility of danger, and also that a smaller quantity of fuel is consumed than where the fire operates in immediate contact with the steam-boiler. The danger of the old construction is considered to arise principally from the external surface of the boiler being exposed to the coal-fire, and to the large quantity of water which it must necessarily contain: for by the continued action of the fire upon the metal, it in time becomes so much weakened as to be scarcely capable of resisting the pressure of the steam, and hence the probability of its exploding.

Inrolled, July, 1821.

To ROBERT BURTON COOPER, *of the Strand, London, for Improvements on, or Substitutes for Stoppers, Covers, or Lids, such as are used for Bottles, Tobacco and Snuff-Boxes, Ink-Holders, and various other Articles requiring Stoppers, Covers, or Lids.*

THIS invention is a metal top, cover, or lid, for ink-bottles, and various other articles requiring close stop-

pers, which consist of three parallel plates, united in the centre by a common axis or pin;—the upper and lower plates being so connected by means of squares upon the centre-pin as to move together, while the middle plate remains stationary. Through these plates three corresponding and coinciding apertures are made for the purpose of gaining access to the interior of the bottle, or other vessel; which access becomes closed, and the interior of the vessel secured air and water-tight, by the two moveable plates sliding round horizontally.

The sliding-plates are moved by the finger and thumb pressing against two knobs on the upper plate, or by a milled edge, or otherwise; the surfaces of the plates which come in contact being carefully ground or polished flat, so as to render the sliding part air-tight. The middle plate is attached to the bottle by a projecting ring, which screws to the neck, or is cemented to the glass; and the inner surface of the stopper is coated with lead to prevent corrosion.

The claim of originality consists simply in the three parallel plates so fitted, and sliding upon a centre-pin, so as to produce an air-tight stopper. Whether the top and bottom plates slide round, leaving the centre plate stationary, or the centre plate slides, the top and bottom plates being stationary is of little consequence: the former is preferred. The mode by which the stopper is affixed to the bottle or other vessel, and the mode of turning the plates round, are perfectly immaterial, the principle of the improvement resting in the adaptation of the three parallel plates, as an air-tight stopper, cover, or lid.

The aperture through the plates to the interior of the vessel may be enlarged or contracted as circumstances require. For the covers of smelling-bottles, or scent-boxes, there may be several small holes; for ink-holders, the

opening must be larger; and for snuff or tobacco-boxes, sufficiently large to admit the finger and thumb. When the contents of the vessel are intended to be occasionally poured out, as of decanters, cruets, &c. then a small tube or curved spout may be fixed to the aperture of the upper plate, and a very small additional hole provided through the plates as a vent. The adaptation of this improved stopper to every description of vessel or article to which it may be found useful, is exclusively claimed by the patentee.

Inrolled, September, 1821.

To William Carter, *of St. Agnes Circus, Old Street Road, London, for certain Improvements in Steam Engines.*

The object of this invention, is to produce a continuous circular motion, by employing the force of steam to act upon four rectangular leaves or pistons, which are so disposed within a hollow cylinder, that the force or pressure of the steam will cause both them and the cylinder to turn round about their axis in one direction. These four leaves or pistons stand radiantly from the centre axle, and extend lengthwise along the interior of the cylinder, where they move in pairs, and operate alternately to force the cylinder round. While one pair is in action, the other pair is held stationary, and sustains the re-action or resistance of the steam. The motion of the leaves and of the cylinder being always in the same direction, reciprocation or retrograde motion is avoided, and the change of the piston is only from

progressive motion to rest, and from rest to progressive motion alternately.

Plate XIV. fig. 2, represents a section of the engine lengthwise; *a*, *a*, is the revolving cylinder, supported in bearers or collars *b*, *b*, in which the cylinder turns; its rotatory motion being communicated to other machinery, by means of the ring of cogs *c*, *c*, which circumscribe the periphery of the enlarged end of the cylinder. The interior of the cylinder is bored perfectly true, in order that the four leaves, or pistons *d*, *d*, *e*, *e*, shewn in the cross section, fig. 3. may move smoothly round, and yet fit so close to the cylinder, as to render the chambers, which they divide, perfectly air-tight, and inaccessible from one to the other.

The narrow leaves *d*, *d*, are united to the solid axis, which occupies the centre of the cylinder; the broad leaves *e*, *e*, are united at each end to two circular plates, which form the ends of the cylinder. By these four leaves or pistons *d*, *d*, *e*, *e*, the internal capacity of the cylinder is divided into four compartments, two of which are to be occupied by steam, while the other two are in a state of vacuum.

The steam from a boiler is conveyed by the pipe *f*, to the steam-box, and thence through perforations (shewn by the arrows) into the neck of the cylinder *g*, *g*, from whence it passes by means of induction aperture *h*, *h*, into the interior of the cylinder. The steam now exerting its expansive force in the narrow compartments, (see fig. 3) separates the leaves or pistons *d*, and *e*, but as there are provisions to stop either of the leaves from retrograding, (as will be hereafter explained,) *d*, *d*, remain stationary, and sustain the resistance of the steam, while the leaves *e*, *e*, are impelled forward, and carry the cylinder round with them. By the rotatory progress which

the leaves or pistons *e*, *e*, have thus made, similar apertures to *h*, *h*, become opened, leading to the eduction passages, and pipe *i*, whence condensation instantly takes place, in the spaces which were lately filled with steam.

The steam is now admitted through other induction apertures to the narrow compartment, just formed by the collapsing of the leaves *e*, *e*, towards *d*, *d*; the force of the steam acting against their surfaces (*e*, *e*, being prevented from retrograding,) the leaves *d*, *d*, are now impelled forward, which by their progress carry the cylinder forward also, (as will be further explained.) Thus the action of the broad and narrow leaves are alternately advancing, but never retrograding, and by their motions the cylinder is made to revolve progressively.

The induction and eduction valves are worked by a sliding ring, seen at fig. 4, which moves a small distance backward and forward, for the purpose of opening and shutting the steam and condensation apertures. The mode of working this sliding ring, is by means of a small lever *j*, figs. 2, and 5, which has its fulcrum upon the end of a rod *k*, *k*, passing through the ends of the cylinder, and through the lower leaf, *e*, as shewn in fig. 2; and another lever, *l*, at the reverse end of the rod *k*, which acts against one of two pins in the wheel *o*. As the leaves or pistons *d*, *d*, advance, the wheel *o*, attached to their axle, advances also and causes one of the pins to strike against the lever *l*, and place the lever *j*, at the other end of the rod, as seen in fig. 5, by which the valve or sliding ring is shifted backward. When the leaves or pistons *e*, *e*, advance, the rod *k*, advances with them, and causes the lever *l*, to strike against the other pin, and displace the lever *l*, which shifts the lever *j*,

into the position shewn by the dots in fig. 5, the sliding ring being by this means slidden forward.

In order to make the valve or sliding ring move quickly into the requisite position, and to keep it steady after it has so moved, a roller is placed at the lower end of the lever *j*, fig. 5, which acts in a curve, so formed, that as soon as the lever, by the above contrivance, is passed beyond the centre of the curve, it instantly slips into its proper position. The lever is allowed to pass, by the curve being made to slide up and down between the rollers *r*, *r*, and having a spiral spring within the box *p*, attached to the wheel *x*, as seen in the section, fig. 2, by which spring it is always pressed up, so as to hold the lever firmly.

A retrograde movement of the leaves or pistons is prevented, (as before alluded to,) by means of wedges and sliding clamps, which will now be shown. At the end of the cylinder, there is a ring *q*, *q*, attached immovably to the same framing as the bearings that sustain the cylinder. Upon the end piece of the cylinder *s*, *s*, to which the leaves or pistons *e*, *e*, are connected, there are wedges *t*, *t*, (shewn detached in fig. 6,) and also loose blocks or clamps *v*, *v*; when the steam exerts its force against the leaves or pistons *e*, *e*, as above described, they are prevented from retrograding, by these wedges jambing the clamps up tight against the fixed ring *q*, *q*, but when the leaves advance, the wedges advance also, and release the clamps, which are then brought forward by the springs *u*, *u*, acting behind them. A similar contrivance prevents the retrograding of the narrow leaves or pistons *d*, *d*. Wedges and clamps of a like form and construction, but acting in the reverse direction, are placed at *w*, *w*, which as the leaves or pistons revolve, wedge up against the interior of the enlarged part of the

cylinder, and cause both it and the cylinder to be carried round as the leaves or pistons advance, by the revolution of which the ring of cogs *c*, communicate motion to other machinery.

The condensing apparatus for this engine may be constructed in the manner as that usually adapted to other steam-engines, the air-pump being worked by the toothed wheels *o*, and *x*; but instead of an air-pump an apparatus may be contrived upon the same principle and construction as the engine above; that is, with two pair of leaves or pistons revolving within a cylinder, but which cylinder must be fixed, not moveable, and the axis of the pistons placed parallel to the axis of the engine,, and at such a distance from it that the two toothed wheels *o*, and *x* may work into similar toothed wheels upon the axis of the air-engine below. By these means the two pair of leaves of the air-engine, or pump, will be moved in a manner corresponding to the leaves of the steam-engine, and the compartments of the air-pump being thereby continually expanded and contracted, will draw off the air and injection-water from the condenser and hence obtain a continual vacuum.

The patentee concludes his specification by the following remarks, which clearly explain the basis whereon he founds his claim of originality and patent-right; and which judicious mode we should be pleased to see more generally adopted; as, without doubt, the more decidedly the specification points out the peculiar novelty claimed, the more secure will be the patent-right granted.

A patent was granted to Jonathan Hornblower, dated 8th of June, 1798, for an engine to operate by two leaves within a fixed cylinder, to give continuous rotary motion to an axis. "My improvement on that engine consists in the particular construction of the engine

as hereinbefore described, and in which it differs from Mr. Hornblower's engine: (viz.) First, my method of introducing and distributing the steam, and conveying it away. Second, my method of applying clamps to prevent the retrograde motion. Third, in making the cylinder revolve, in order to give motion to the machinery: And fourthly, in applying two pair of leaves instead of two single leaves, whereby the force is made equal on the opposite sides of the centre or axis of motion."

Inrolled, May, 1821.

To WILLIAM ANNESLEY, *of Belfast, in Ireland, for certain Improvements in the Construction of Ships' Boats, and other Vessels.*

THIS invention was the subject of a patent granted to Mr. Annesley for an exclusive right to make, use, exercise and vend the same within England, Wales, and the town of Berwick upon Tweed, dated April, 1818. The present patent is for granting the same privilege to him "within all His Majesty's Colonies and Plantations Abroad."

The improvements in constructing ships' boats and other vessels consist, first, in making the hull of the same of three or more layers of planks, the direction of the grain of the alternate layers proceeding from bow to stern, and that of the intermediate layer passing from one gunwale around and under the vessel to the other gunwale without being cut or separated by the keel, the whole of the planks being well pinned, trenailed or bolted together, without frame-timbers, beams, knees, breast-hooks, or stern.

The thickness and number of layers of planks must depend upon the strength required for the tonnage of the vessel, and the service in which she is intended to be employed. For small boats, where great strength is not required, sometimes only two courses of planking will be found sufficient: that is, if according to the improved principle the outside layer is placed longitudinally, and the inner transverse round the boat from gunwale to gunwale, by which an equality of thickness and strength is preserved throughout the whole, by its presenting a continued curved surface uninterrupted by the keel or other timbers; which continuity of surface and equality of strength throughout render the vessel much better able to resist a shock than any mode of construction where the planks terminate in an angle against a piece of stout timber; as, upon this improved plan, the effect of a shock would be merely to cause a vibration of the whole, but no partial strain in any part, because one part would not be weaker than another.

The second part of the improvement consists in making the keel in three thicknesses; the middle, called the core of the keel, being of timber keyed together, and lying horizontally fore and aft, which is to be cased with planks placed vertically on each side crossing the core, together with a horizontal plank under the whole, called the sole, for the purpose of protecting the ends of the cross planking.

The third part of the improvement consists in producing, from a given model on a small scale, a set of temporary frames, or moulds, for the purpose of giving to the hulk of the vessel the same figure and relative proportion as the model. To effect this object a model is made out of a solid piece of soft wood to the shape required, according to the service for which the vessel is

intended, upon a scale of not less than a quarter of an inch to a foot; to this are affixed a keel and cutwater, in such a manner as to be capable of being detached from the hull. This model is then cut through at right angles to the keel, in as many places as the builder intends to provide temporary frames for giving the layers of planking their proper support and figure, while building the vessel. Two or more horizontal sections are also made in the bow of the model, in order to ascertain the proper curvature for corresponding moulds; or, instead of these, oblique sections may be cut in the model, at right angles to the tangent of that part of the cutwater at which the mould should be placed. All these sections are to be made through the model of the hull, but not through the cutwater or the keel.

A perpendicular line is now to be drawn upon one of the surfaces of each section, which, of course, divides it into equal parts; now, from a centre at the top of this line, describe a quadrant, and divide it into any number of equal parts or angles; then draw lines from the centre through the graduations of this quadrant, extending upon the surface of the section to its extremity. From this scale the relative proportional distances of the corresponding lines and points on the large scale are to be obtained; by drawing a line through all these points the true curve of one side of the vessel is given, by which the exact dimensions of the ship, boat, or other vessel are accurately known. Thus, by making temporary frames to the figure of each section, and by erecting and supporting all the frames at the same proportionate distances, an accurate skeleton of the vessel is produced, on which the first course of fore and aft planks is to be bent, and secured by screws from the inside.

To obtain the curvature of the upper part of the keel

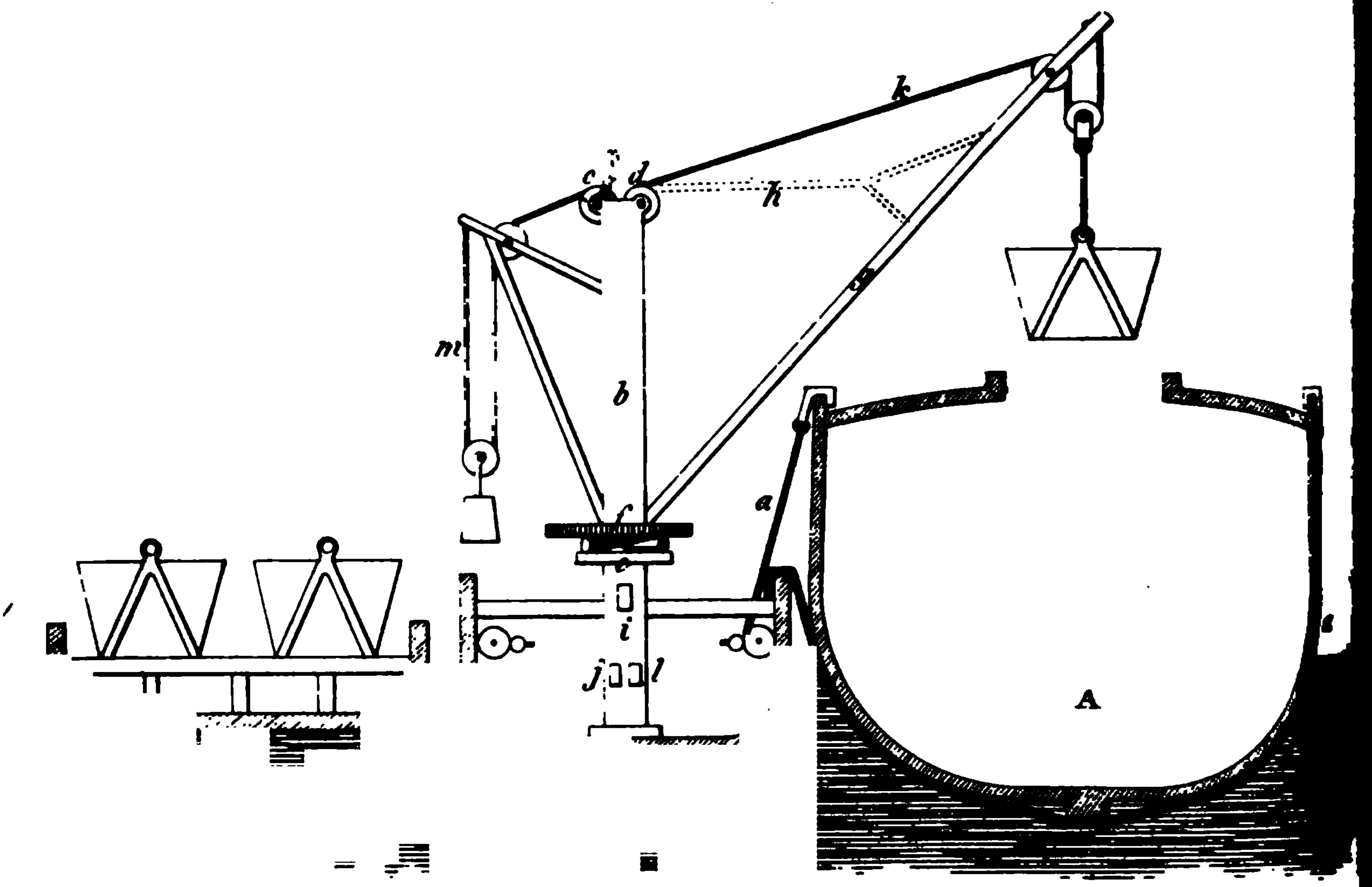
or run of the vessel, its length on the model is divided into a convenient number of parts by perpendicular lines, which proportions are transferred to the real keel, as above described.

The decks of the vessel are supported by bending planks round the sides, in order to form a rebate with stringers, breast trimmers, cross planks, to form the fore scuttle, main hatchway, and after gangways, and to support the masts with temporary joists to give the curvature of the deck. Upon these a course of cross planking is laid, which extends to the last or outer course of side-planks; and this, being well sheathed with paper dipped in tar, is now covered by the finishing course of planks laid fore and aft.

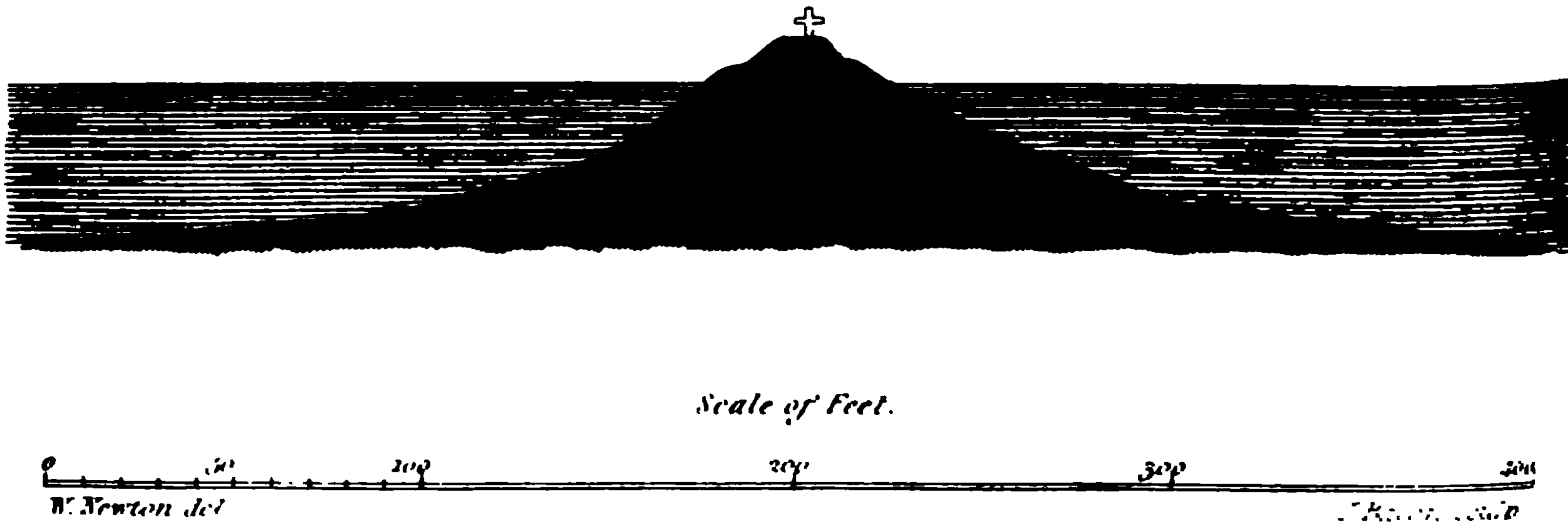
In the above description the system has been explained as referring to building a vessel of fifty or sixty tons. In the third course it is proposed to lay sheathing-paper dipped in tar, the joints being slightly caulked. The fourth course is also to be covered with sheathing fastened by wooden pegs, so that no iron may be in the way of the augur; and the whole of the work may be payed over with hot stuff and the paper put on instantly, so as to adhere without pegs and shew a fair surface to the last course, by which moisture will be effectually resisted, and a considerable expense saved. A composition of quick lime and linseed oil made fine should be well pressed into the seams of each course, and a very thin coat laid over the last planking, would tend to preserve the wood from decay and secure it from damp; or white lead and oil in some cases may be preferred in laying on the wales, bends, mouldings, &c.

This vessel may also be caulked outside and inside, the up and down planking of the keel and deadwood at the bottom. As the bottoms of all vessels are most liable

Chapman's mode of transfering lading.



Section of Plymouth Breakwater.



to be injured, they may, in this system, be simply and cheaply strengthened, as the keelson rises one inch above the inner planking, by laying pitch, pine, or oak of that thickness along as far as her bilge, and afterwards cross planking and caulking it; one third would be added to the strength of the vessel, and, in case of extremity, were her deadwood and keel beat off when cast ashore, the vessel would remain tight and preserve the crew and cargo safe. The greatest facility is afforded by this system for coppering the bottom, as no iron can come in contact with it.

Inrolled June, 1821.

To WILLIAM CHAPMAN, *of Newcastle upon Tyne, for his method of Transferring the Ladings of Lighters and Barges into Ships or Vessels, or from Ships or Vessels into Lighters and Barges.*

* THE object of the machinery for which this patent is obtained will be best understood by prefacing its description with a short account of the manner in which coals are usually conveyed to the vessels when loading

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* These introductory observations are communicated by the inventor; and we here beg to observe that if patentees in general would favour us with such explanatory remarks upon the application of their respective inventions as might not have been thought necessary to introduce into the inrolled specification, their own interest would frequently be furthered, and the enquiring reader materially informed.

in the harbours of Sunderland and Shields. At the collieries near the rivers Tyne and Wear, the coal after being brought up the pit has a considerable portion of the small skreened off previous to loading it in the waggons which convey it to the shipping-places. From hence the coal is usually carried in keels (a species of lighters) to the side of the vessels intended to convey it by sea, and is there cast into the vessel by shovels; in consequence of which the coal becomes much broken, and rendered less saleable. To avoid this injury, as well as to reduce the expenses of carriage, and of loading into the ships, one large colliery near the river Wear laid a waggon-way of many miles in length to a place where coal-vessels could take in their loadings without the intervention of keels, which has been attended with such advantages as would have induced other coal owners to follow the example, but for the attendant consequence of throwing out of employment a great number of men. Of these the keelmen, regularly brought up to the navigation of the keels, are not fitted by their habits to any employment essentially different:—while the others, termed casters, from casting the coal into ships, may find employ casually other ways, being clearly capable of applying themselves to any common species of labour.

It was obvious that, unless measures were devised to prevent the breakage of coals conveyed by keels, such collieries up the Wear as had the means of obtaining rail-ways to the ships, must have sacrificed to the desire of giving employment to the keelmen and casters more of their interest than could reasonably have been expected. Influenced by the desire of at least retaining in employment the regular body of keelmen, one of the greatest coal owners on the Wear, Mr. Lambton, shipped his coals into chalder-boxes, or cases, in the keels, which

very little exception. This apparatus, called the tr
ferer, is a sort of compensation crane, to be fixed about
midships of a barge, and then secured to the bot
and to the beams or cross pieces. The crane, when t
erected in the barge, is intended to be brought along
of the ship, and there the barge must be secured
means of chains, or ropes and grappling-irons, in orde
prevent it from heeling towards the side. On the
side of this transferer is to be placed the keel or ligh
which has brought the coal from the pit in chalder-bo

Plate XVI. fig. 1, exhibits a cross section of the th
vessels, *A* the ship, *B* the transferer, *C* the keel. Ch
or ropes *a*, as above-mentioned, are connected to
side of the barge and to the gunwale of the ship,
passed under the hull so as to keep the transferer from
setting or heeling while the boxes of coal are raised si
out of the keel. As the ship acquires her lading
draws more water, which renders a necessity of s
ening the lower bracing cord or chain, and tight
the upper one. The bracing may also be further se
by connecting the sides of the transferer to the rig
the ship.

In the transferring barge *B*, a hollow column *b*
square at the base and cylindrical in the shaft; at
of this column there are two pulleys *c* and *d*;
of which the chain passes that carries the coal
over the other that which carries a compensatio
intended to aid the power of this machine in
load of coal; *e* is a flat plate upon which sev
cal rollers work, supporting the upper plate *f*
bling it to turn horizontally with a small deg
tion; *g*, is the jib or long arm of the crane, w
near the end, to conduct the chain that suppo
box. The arm or jib is capable of adjustme

to any angle required (so as to suspend the load over the hatchway) by turning upon an axis or joint at bottom, so as to be raised and lowered by the chain *h*, which chain passes over a pulley not seen down the hollow cylinder *b*, and over another pulley *i*, to a barrel with a windlass situate in any convenient part of the barge.

The chain *k*, which suspends the coal-box, passes down the cylinder *b* and over the pulley *l* at bottom, from whence it proceeds along the barge and over a barrel; the chain *m*, which suspends the compensation weight, also passes down the cylinder over the pulley *j*, and along the barge in the reverse direction, and over a barrel from which the chains extend and are connected, so that, as the coal-box is raised, the compensation weight descends; and, as the coal-box is lowered, the weight rises. The compensation is intended to be about half the weight of the articles raised, so as to approximate both to the weight of the vessel loaded and unloaded, and hence, to relieve the power.

The crane is to be worked, that is the weight raised, by attachments to a steam-engine, but the particular mode is not shewn. The horizontal motion of the crane is effected by means of the cogs upon the plate *f*, which cogs are to be worked by a toothed-wheel, also connected to the steam-engine.

The crane turns horizontally through half a circle, in order to convey the loaded coal-box from the keel to the ship; but it must then return through the same arc, or the chains, which pass down the hollow cylinder to the pulleys below, would cross and entangle. When the box is thus suspended over the hatchway it is turned over, and the coal cast into the hold.

Another plan is also devised for raising the coal, dif-

fering in a small degree from the former, in which it is proposed to carry the box over the transferrer from the keel to the ship, by a lever, or two levers, forming a frame moving vertically. To these levers there are chains or ropes, passing over pulleys attached to the frame or standards, which, in a manner very similar to that just described, carry a compensation weight which traverses from side to side opposed to the loaded box.

Inrolled, June, 1821.

Original Communications.

To the Editor of the London Journal of Arts, &c.

SIR,

As my patent,* improved lamp has not, from professional avocations, yet been introduced to the public, nor has any description of its construction appeared before the scientific world, permit me, through the medium of your valuable Journal, which is so usefully devoted to improvements in the arts, to offer some observations upon its novelty and advantages.

This lamp, upon the pneumatic principle, is, by permission of the Honourable and Right Rev. the Bishop of Durham, denominated the "BARRINGTON LAMP." It may be varied in form without deviating from its principle, its internal construction being shewn in Plate XV. fig. 2.

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* "To Thomas Machell, Apparatus for applying air for medical purposes, and applicable to the burning of oil in lamps," &c. &c.

Inrolled Feb. 1819.

The external appearance of the lamp is a regular column, fig. 3; but it is capable of being fashioned in almost an endless variety of shapes, according to the taste of the purchasers, or design of the workman. The flame is emitted at the top of the capital, and is free from the ordinary incumbrances which produce shadow; it is more portable and less liable to injury from accidents, than any other construction of lamps of equal magnitude. The reservoir containing the oil, is placed at the bottom of the lamp in the pedestal of the column, which has two perforations on its upper surface, one for the introduction of the oil *a*, the other to receive a condensing syringe *b*, for the purpose of pumping in an additional atmosphere. At the top of the capital is the stop-cock *c*, of the oil reservoir, which is opened and shut by a small lever. The loose cover *d*, forms a moulding to the upper part of the pedestal, which, upon being removed, exposes the openings of the reservoir and pump. The detached part fig. 4, serves as a cotton-holder, in fixing the wick upon the burner; and the end *e*, when screwed into the piston *b*, forms the handle of the pump; the opposite end is intended to be fitted upon the nut of the oil-stopper, to give a due purchase for screwing and unscrewing it.

Method of using the Lamp.

1. Take off the glass globe, or chimney, and also the brass ring on which it stands.

2. Remove the cover from off the top of the reservoir *d*, by lifting it carefully over the pillar.

3. Turn the handle of the stop-cock *c*, to the left, which closes the rising column of oil.

4. Put the square end of the key, fig. 4, on the nut of the screw-cap, and, having unscrewed it, lay it aside.

5. In the like manner, remove the second screw, which is under the first; through the opening, which is then exposed, fill the reservoir with oil, and replace the screw, which will close the chamber air-tight.

6. Screw the end *e*, of the key, into the pump-rod *b*, and work it up and down to its full extent for thirty descending strokes; remove the key and replace the detached parts, and the lamp will then be ready for use. The pressure of the condensed air in the chamber exerting its force upon the surface of the oil, will now raise it in the tube of the column, and continue to supply the cotton of the burner as long as there is sufficient oil in the chamber below remaining to cover the entrance of the tube.

When the lamp is about to be lighted, turn the lever to the right, which opens the stop-cock of the oil-column, and then light the wick in the usual manner. The stop-cock *c*, must invariably be shut when the lamp is extinguished, or the oil will be found to flow over; and when again wanted for use, nothing is requisite but to cut or rub off the burnt part of the wick; open the stop-cock and light the lamp, as in the first instance, when it will be found to burn with great brilliancy.

An inconvenience inseparable from former lamps is, the rapid charring of the wick, requiring it to be frequently renewed by cutting, or rubbing off the destroyed part during the time of burning the contained oil, which is generally about a pint. In this lamp the quantity of a pint and a half may be consumed, without the least attention to the wick in that respect, and the common fish, or even vegetable oil, may be used with equal advantage, as to the durability and brilliancy of the flame: for the rising oil passes through a small filter at the lower part of the tube in the column, which adds considerably to the fineness of the oil, and the reservoir being rendered

perfectly tight, completely prevents the unpleasant smell frequently complained of.

The BARRINGTON LAMP produces a light incomparably brilliant, steady, and pleasant to the eye, without smoke or smell, or any effluvia offensive in the smallest degree. There is not any fluctuation in its burning, and its comparative cheapness will be found perfectly astonishing, This lamp will burn for ten hours with a light equal to ten candles, at the cost of three-pence only. It differs materially from most other lamps, by having its oil-reservoir at the bottom of the column instead of the top; from this circumstance the rays of light emanate from the whole volume of the flame, without interruption from the reservoir; an advantage distinguishing it from every other description of lamp, in which a hollow wick is employed. The extent also to which the oil flows spontaneously, after the chamber is charged with condensed air, will be always in proportion to the propelling force, whereby a tube of one quarter of an inch diameter will supply the flames of 500 burners, and at a remote distance from the reservoir. The force of the condensed air acting upon the surface of the oil produces a gradual supply to the flame, and converts every particle, attracted by the wick, into vivid combustion, and, on that account, while it gives the greatest quantity of light, it avoids both smoke and disagreeable effluvia.

If this communication should appear to you, Sir, of sufficient worth to claim a place in that valuable repository of mechanical information the "London Journal of Arts," its insertion will confer an honour upon

Yours, &c.

THOMAS MACHELL.

Ryder Street, St. James's.

Novel Inventions.

Condensation of the Vapour emitted from Gas Burners.

An apparatus has been lately invented, by Mr. Debaufer, of Creed Lane, London, called "*The* Gas Perdifume, *or complete* Evaporating Smoke Consumer, *without the aid of tubes along the ceiling.*" It consists of a hollow globe or urn, open at the bottom, with a tube extending some distance up the interior, the mouth of the tube being enlarged, and with a glass chimney is suspended over the flame of the gas burner. The inventor states that this apparatus entirely condenses the steam, and consumes the smoke arising from the burning of gas; that it supersedes the necessity of unsightly tubes hitherto used, and will prevent, in future, the many complaints of damage to goods through the smoke, heat, and steam arising from gas burners. The contrivance is very portable, and may be made in a variety of tasteful shapes, either modern or antique. Plate XV. fig. 5, represents the perdifume suspended by a chain immediately over a burner; *a*, is a hollow ball, or it may be, as above said, in the form of an urn, of metal with a pipe or tunnel shewn by dots, *b*, and a chimney of glass, *c*; the vapour ascends the chimney, *d*, from the burner, and passing through the chimney, *c*, enters the tunnel, *b*, from whence it proceeds into the hollow ball, *a*, and there becomes condensed, and, as the inventor says, consumed. The apparatus seems to prevail in London; and there are many testimonials in its favour; but the mode by which it is said to effect its object, is by no means satisfactory to us; neither is the fact itself evident. We should

be happy to receive from the inventor an experimental communication, demonstrating that it really accomplishes the object which is designed.

Stained Glass by Mr. and Mrs. PEARSON.

THE art of painting on glass has long been an object of attention, but may be said to have remained in a continued infancy till within these few years. The specimens which still exist of Queen Elizabeth's time are formed like mosaic, by various pieces of glass being joined together with lead; but these, from their mechanical construction, scarcely deserve the name of paintings. Another method has also been much practised in a neighbouring country: it consists in painting a plate of glass after the usual manner, which is protected from the air by a thin plate of clear glass placed before and a ground plate behind it. But the colours of specimens thus formed have not been found permanent. The last method, and that which indeed most painters have had in view, is to paint the glass, and, by afterwards heating it in a furnace, to incorporate the colours, so that one could not be destroyed without the destruction of the other. By experiment, it has been found, that the common colours cannot be brought to bear the action of fire, and, consequently, the chemists have for a great length of time been engaged in examining various minerals and metals, which would bear as pigments such a potent ordeal. This desirable object has, it is said, been at last accomplished by Mr. and Mrs. PEARSON, who are now exhibiting *paintings on glass in vitrified colours*, which do great honour to the art. *The Cartoons of Raphael* on

glass, in this collection, are fine specimens of the art; the exhibition is altogether one of great interest and beauty.

Description of a Hydrostatic Balance, by which the Specific Gravities of Minerals may be ascertained without Calculation. *By* BENJ. H. COATES, *M.D.* *Read June* 16, 1818.*

THE present instrument (see Plate XV. fig. 6,) has arisen from one lately presented to the Academy, in which the common steel-yard is employed for this purpose.

The object of the alteration is, without rendering the instrument more complicated, or more troublesome in its application, to save the labour and inconvenience of calculation. By means of it, the specific gravity of a mineral may be ascertained in a few moments, and without pen and ink, or any other assistance than a cup of water. With the aid of the neatness and convenience of the instrument on which it is grafted, it is hoped to be a practical saving of time and labour to the mineralogist.

The lever resembles that of a common steelyard, and is contrived to balance exactly, by making the shorter end wider, and with an enlargement at the extremity. The upper edge of each limb is rectilinear, and free from notches, for the sake of accuracy in adjusting the weights.

The shorter end is undivided; but on the longer is inscribed a scale, of which every division, reckoning

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* From the Journal of the Academy of Natural Sciences of Philadelphia, Vol. I. Part II.

from the extremity of the lever, is marked with a number, which is the quotient of the length of the whole scale, divided by the distance of the division from the end. Thus, at half the length is marked the number 2, at one-third, 3, at one-fourth, 4, &c. Also, at two-thirds, the length is marked $1\frac{1}{2}$, at two-fifths, $2\frac{1}{2}$, &c. And so of all the fractions, sufficiently minutely. These numbers extend as high as the specific gravity of platina;—the pivot of the instrument represents unity, and a notch is made at the further end.

In using this instrument, any convenient weight is suspended by a hook from the notch at the end of a scale. The body under examination is to be suspended to the other end by a horse-hair, and slid along till an equilibrium is produced. It is then, without altering its situation on the beam, to be immersed in water, and balanced a second time by sliding the weight. The hook of the latter then marks the specific gravity on the scale.

The demonstration of this is very simple. The instrument being supposed in equilibrium, and B D (see figure) and the weight of the counterpoise being constant, the weight of the body varies as the distance of the counterpoise from B, by the common principle of the lever. Hence, if C be the place of the weight at the conclusion of the operation,

Weight in water : weight in air : : B C : B A. And, by subtraction, the loss of weight in water . weight in air : : A C : A B ; and hence

$\frac{\text{wt. in air}}{\text{loss}} = \frac{A\,B}{A\,C} =$ the spec. grav.; which is the rule. Q. E. D.

Substances lighter than water may have, if necessary, their specific gravity ascertained by the usual method ; a scale of equal parts being cut on the opposite side of the

beam, and the article to be weighed placed in a notch for the purpose. For mineralogy, however, this will seldom be necessary. The bottom of the notch A (at the smaller end) should be in a line with the edge of the scale, its sides being a little raised. The top of the shorter end should be rather the thickest part of it, to allow the horse-hair, by which the mineral is suspended, to swing clear. This mode will be found very delicate and accurate, and a hook must not be used, as it cannot be balanced.

The instrument, in this form, is exceedingly compact, and may be reduced to a simple rod.

The principle is capable of being applied (as in an instrument I have made) to an arc of a circle, with a rod resembling in its application a common bent lever.

Plymouth Breakwater.

The length of this stupendous undertaking is intended to be 1,700 yards or nearly a mile, extending across the middle of the Sound from east to west, and leaving an entrance at each end; the centre is to be 1000 yards in a straight line, and 350 yards at each end to be bent towards the north at an angle of 104° with the centre part. The breadth at the bottom is not to be less than about 250 feet, where the water is 30 feet deep, and 10 yards towards the summit at the height of 10 feet above low water mark, or 40 feet from the bottom. The work was begun at the centre; and the plan, as far as the work has hitherto proceeded, has been strictly adhered to, except that the dimensions are greater than those above stated, In July last, the foundation of the whole fabric was laid; the width at the base (see Plate XVI.) is 400

feet, and gradually diminishes to 48 feet a little above high water mark, having a smooth walk or pathway full 6 feet wide from end to end. This finish or causeway is composed of very large blocks of stone, many of them upwards of ten tons each. Towards the middle of the breakwater, a small jetty is carried out on both sides, for the purpose of enabling boats to land in any weather. About 1000 yards are completed, and two million tons of stone have been already employed. The stones now employed, weigh upon an average from 5 to 10 tons each; none of smaller dimensions are used; although at the commencement of the undertaking many thousands of stones were employed of one ton weight each. The stone employed is Devonshire marble, very hard and compact, showing colours in spots or small veins of black, white, and red; it is susceptible of a good polish, and well adapted for chimney pieces and other ornamental works. The quarry is situated up Catwater near the mouth of the Plym. The rock at the water's edge is 25 feet high and it rises to about 75 feet at the highest part. Government gave ten thousand pounds to the Duke of Bedford for an extent of from 20 to 25 acres, of which 8 acres have been already cut away and employed. The various contrivances for obtaining those enormous masses, by blowing up the rock, for conveying them to the water-side, and on board the vessel which carries them to the breakwater, as well as for placing them with care in their proper position, reflect the highest credit on the skill of the engineers, and are a striking example of the wonders that may be effected by the aid of machinery. It ought to be mentioned that the construction of this breakwater originated in the proposal of Mr. Whidby, and that the plans were the joint production of this gentleman and Mr. Rennie; and also that the work is so

far advanced to its conclusion as to have fully justified the expectations formed of its utility, by the safety which great numbers of vessels have already derived from it.

It may also be mentioned that besides the construction of the breakwater for the improvement of the harbour of Plymouth Sound, several rocks have been removed at the bottom of the sea, which might have injured vessels that happened to anchor over them; many of these rocks being 36 feet below the surface, it has been necessary to employ a diving bell, composed of strong wrought iron, 6 feet long, 5 wide and 7 high with shelves inside for the workmens' tools. Two men generally go down together, the machine being lowered over the rock intended to be levelled. They use hammers and picks to break the rock, and put the fragments in a canvas bag; they remain two hours below water, when they are relieved by two others; some rocks have been lowered 9 feet, and made level with the surrounding ground.

Literary Gazette.

On the Construction of Safety Valves for Steam-boilers.

NOTWITHSTANDING the numerous improvements upon the steam-engine which are daily making, it is still a desideratum in the use of the steam-boiler to construct a safety-valve which shall depend as little as possible upon the engine men for the certainty of its operation. For this purpose, Mr. ADIE suggests that a piece of plate copper might be introduced into the manhole of the boiler, the strength of which should be previously so adjusted that it shall give way when the expansive force of the steam exceeds about one half more than the pressure at which it is intended to be wrought. For the

greater safety of those near the boiler, a wooden or metallic pipe might be made to rise 12 or 14 feet above the boiler. Although this description of safety-valve would perhaps, when occasionally thrown off, deprive us for a time of the use of the boiler, yet the object of the greater safety of persons in its neighbourhood would be obtained.

Edinburgh Journal of Arts.—No. IX. page 152.

Review of New Publications.

A literary and critical notice in our Journal of the most important and useful works which are continually issuing from the press, and which relate to the Arts and Sciences, has been more than once pressed upon our attention. We have therefore determined to devote a few pages of each number to this subject; and we trust that in our criticisms, rigid impartiality will be found a distinguishing characteristic.

[Authors and Publishers, who desire an early notice of their works, are requested to transmit copies of the same to our publishers.]

The Code of Agriculture; including Observations on Gardens, Orchards, Woods, and Plantations. By the Right Hon. Sir JOHN SINCLAIR, Bart. *Third Edition; enriched by the Remarks of a number of the ablest practical Farmers in England, Scotland, and Ireland.* 8vo. pp. 748.

THIS valuable work has been some time before the public, and the sale of two large impressions has sufficiently proved its importance and its worth. But, as the present edition is considerably extended and improved, having nearly 100 additional pages of new and interesting matter, we feel it our duty to direct the public attention to it.

The right honourable and venerable author, during the course of a long life, has evinced himself one of the best patriots of the age; and has had opportunities of acquiring information upon the great and important subject of agriculture, which few other persons ever obtained; or which, having obtained, have not, like him, collected and arranged for the general benefit of mankind.

The work is divided into five chapters, which are again subdivided into numerous sections. The *first chapter* contains the *Preliminary Points to be considered before a Farmer can undertake with prudence the occupation of a Farm;* these consist of Climate, Soil, Elevation, Aspect, Situation, Size, Tenure, Rent, Parochial and National Taxes, &c.

The *second chapter* contains the *most essential means of carrying on the improvement and cultivation of a Farm;* these consist in Capital, regular Accounts, Arrangement of Labour, Servants, and Labourers, Live Stock, Implements of Husbandry, Buildings, Water, Size and Shape of Fields, and Roads.

The *third chapter* treats of the *various modes of improving Land.*

The *fourth chapter* treats of the *various modes of occupying Land;* this chapter is subdivided into four sections:—on the Cultivation of Arable Land—on Grass Land—on Gardens and Orchards—on Woods and Plantations.

The *fifth chapter* treats on the *means of improving the agricultural state of a Country.*

To these is subjoined a copious *Appendix*, containing a variety of miscellaneous information not strictly referable to either of the preceding chapters. *Nine* plates are also added, explanatory of the implements, &c. necessary in this first of all arts.

Having given the outlines of this last and most important work of the Right Honourable Baronet,—a work which ought to be in the hands of every agriculturist in the world, we might here close our account of it; but this we shall not do, till we have made our readers acquainted with a specimen or two of the matter which the Code of Agriculture contains.

The Principles on which Lime operates as a Manure.

"Quick-lime in powder, or dissolved in water, is injurious to plants; hence grass, watered with lime-water, is destroyed. But lime, freshly burnt or slacked, forms a compost with vegetable matter, which is partly soluble in water and nutritive to plants. When applied to land in a powdery state, lime tends to bring any hard animal or vegetable substance into a more rapid state of decomposition. It also renders salts and other matters not easily decomposed, miscible in water, thus promoting vegetation. If used, in a hot or caustic state, to strong and retentive soils, it will not only subdue their tenacity, but will communicate a certain degree of warmth to the ground. Light soils, from the application of lime, become adhesive and more retentive of moisture.

"Sometimes limestone is almost perfectly pure, as is the case with marble. But several sorts of limestone have mixtures of clay and sand in various proportions, by which the efficacy of the manure is considerably diminished. It is necessary, therefore, to analyse limestone to ascertain the proportion of pure lime, before using so expensive an article in great quantities; more especially if it must be conveyed from a distance. Bituminous limestone makes good manure. But the magnesian is the species which requires the greatest attention. Limestone sometimes contains from 20·3 to 23·5 of magnesia, in

which case it would be injurious to weak soils, from the peculiar qualities of the lime, to apply more than from twenty-five to thirty bushels per statute acre; though in rich soils double that quantity may be used, and still more with peat, on which soil it would have a most powerful effect in producing fertility.

"Limestone is burnt in kilns of various construction, and with various sorts of fuel. It is applied with advantage to soils recently reclaimed, in a caustic state; but is generally *slacked*, by throwing water upon the lumps until they crack and swell, and fall down into a fine powder. This operation, when it is to be done, should not be delayed: for, if properly burnt, it is easily reduced to a fine powder, which may not be the case if the slacking be postponed. If water cannot be easily obtained, the lumps may either be divided into small heaps and covered with earth, by the moisture of which they are soon pulverized; or they may be made into large heaps, the lumps and earth in alternate strata, the lumps four inches and the earth six inches thick, and the whole covered with earth. Where it can be easily had, it is a great advantage to slack the calcined limestone for manure with sea-water. Summer is the proper season for applying lime: for the land ought not only to be dry, but the surface as free from moisture as possible, so as to promote the equal distribution of the manure. The most profitable period for applying lime, is, Mr. Rennie of Phantassie thinks, when the land is under summer fallow, in the months of June and July, that it may be completely mixed with the soil before the crop is sown. This is also the general practice in other districts. For a turnip crop, it should be laid on in the spring, or early in the summer, before the turnips are drilled. When applied to old ley, it is a good practice

not only destroys the germination of any smutty powder attached to the grain, but it likewise prevents its being attacked through the root by any other parasitical plant that may be found in the soil, and thus may escape other accidents or disorders to which wheat is liable.

"The best mode of using the BLUE VITRIOL (sulphate of copper) is as follows: Into eight quarts of boiling water put one pound of blue vitriol; while it is quite hot, mix three bushels of wheat with five quarts of the liquid, and at the end of three hours add the other three quarts. The three bushels of wheat are to remain three hours longer, or six hours in all, in the liquid. The whole should be stirred three or four times during the six hours, and the light grains taken off. Then add a sufficient quantity of slacked lime to make the wheat perfectly dry. It may remain in a heap for six hours; it may then be spread open, and used the next day, but not sooner. Wheat thus prepared may remain unsown for any space of time without injury. This application does not prevent the rust or mildew, yet for the smut it is an *infallible antidote.* The grain should be perfectly dry when the solution of copper is applied."

Concluding Observations on Draining.

"So sensible are landed proprietors become of the deep interest they have in executing this most important species of improvement on a liberal and extended scale, that it is a practice with many to have a *general plan* for the drainage, and regular division of the different farms when their estates are newly let; thus availing themselves of an opportunity to have the plan executed in a methodical, substantial, and permanent manner, under professed drainers and labourers, solely employed in this essential work. On this great scale of drainage, the con-

nexion of one farm or part of an estate with another renders the effect more complete, and ultimate charges much less. Indeed, so sensible are the tenants of the advantages of this system, that they give it a preference to that of having the work done at their own expence, with the certainty of indemnification, and in their own manner.

"While such are the advantages to be derived from draining, it is unfortunate that any obstacles should exist to the execution of such a useful improvement. Unless Parliament, however, will direct its attention to the subject, and enact regulations for the encouragement of draining, the efforts of private individuals will often be checked, and much valuable land will continue unproductive. A more complete exemption from the tax on draining bricks would be of great use. A law might also be passed, authorizing proprietors, even on entailed estates, to charge their land with three-fourths of the expense of drains, as they can at present of inclosures; and to compel the neighbouring proprietors to be at a share of the expense of draining, if they derived any benefit from it, as is the case in Scotland, when fences are made on the boundaries of different estates.

"The laws of a nation ought to be improved from time to time, to keep pace with the accessions of knowledge which the people acquire, and with the necessities of the country as it becomes more populous. The Code of Rural Legislation of Great Britain unfortunately has not improved in the same ratio with its increased population, and thence it is as little calculated for the number of its inhabitants at this time, as its produce a century, or even half a century ago, would now be sufficient for their maintenance. It is not here meant that the laws should interfere with the rights of private property farther

than the public good absolutely requires. More effectual regulations, however, for promoting cultivation, drainage, and enclosure, ought now to be enacted, the existing laws being imperfectly calculated for promoting these essential improvements. A real statesman should always keep this maxim in view: that laws ought to change with the circumstances of a country, and above all the same system which might be calculated to govern and to secure the sustenance of six millions of inhabitants will not answer equally well when the population has increased to twelve millions or upwards. The changes, however, should be gradual, and at a proper season. If they are too long pertinaciously resisted the evil increases, too many alterations must be made at once, and the changes are then attended with the hazard of convulsion."

We have thus given a brief view of this interesting volume, a volume which contains the most luminous summary of agricultural knowledge which has ever been published, and which will convey the name of SINCLAIR to posterity as one of the best benefactors to our species.

A Supplement to the Pharmacopœia, being a Treatise on Pharmacology in General; including not only the Drugs and Compounds which are used by Practitioners of Medicine, but also those which are sold by Chemists, Druggists, and Herbalists, for other purposes; together with a Collection of the most useful Medical Formulæ; an Explanation of the Contractions used by Physicians and Druggists; the medical arrangement of the articles of the London Pharmacopœia, with their doses at one view;

be no question: for without such books of reference, the anxious student must remain very often, relative to many subjects, in total ignorance. The first aim, therefore, of a compiler of a dictionary should be to make it an *explanatory work*, so that whenever reference be made to it, it may be found strictly to fulfil this important and primary object. We are led into these observations because we have frequently observed that, in many scientific dictionaries and cyclopædias, this object has been too little attended to; the writers having been too often anxious rather to display their own learning, than to make that learning intelligible to those for whom dictionaries are chiefly designed.

We have examined the dictionary of Dr. Ure with these impressions, and are enabled to state that as an explanatory dictionary of modern chemistry it ranks high. Its merits are, however, not confined to explanation; it contains an abundant mass of facts of the greatest interest and utility, and is altogether a work without which the library of the chemist will be incomplete. But the utility of this work is not confined to the chemist; the artist, the manufacturer, and the agriculturist, will here find much matter deserving their best attention. From the article DYEING we abstract the following:

"The following are the dye-stuffs used by calico-printers, for producing fast colours. The mordants are thickened with gum, or calcined starch, and applied with the block, roller, plates, or pencil.

1. *Black.* The cloth is impregnated with acetate of iron (iron liquor) and dyed in a bath of madder and logwood.

2. *Purple.* The preceding mordant of iron diluted; with the same dyeing bath.

3. *Crimson.* The mordant for purple united with a

portion of acetate of alumina, or red mordant, and the above bath.

4. *Red.* Acetate of alumina is the mordant (see alumina) and madder is the dye-stuff.

5. *Pale Red* of different shades. The preceding mordant diluted with water, and a weak madder bath.

6. *Brown or Pompadour.* A mixed mordant, containing a somewhat larger proportion of the red than the black; and the dye of madder.

7. *Orange.* The red mordant; and a bath first of madder, and then of quercitron.

8. *Yellow.* A strong red mordant; and the quercitron bath, whose temperature should be considerably under the boiling point of water.

9. *Blue.* Indigo rendered soluble and greenish-yellow coloured by potash and orpiment. It recovers its blue colour by exposure to air, and thereby also fixes firmly on the cloth. An indigo-vat is also made with that blue substance diffused in water with quick-lime and copperas. These substances are supposed to deoxidize indigo, and at the same time to render it soluble.

Golden-dye. The cloth is immersed alternately in a solution of copperas and lime-water. The protoxide of iron precipitated on the fibre, soon passes by absorption of atmospherical oxygen into the golden-coloured deutoxide.

Buff. The preceding substances in a more dilute state.

Blue-vat, in which white spots are left on a blue ground of cloth, is made by applying to these prints a paste composed of a solution of sulphate of copper and pipe-clay, and after they are dried, immersing it stretched on frames for a definite number of minutes in the yellowish-green vat, of one part of indigo, two of copperas, and two of lime with water.

Green. Cloth dyed blue and well washed, is imbued with the aluminious acetate, dried and subjected to the quercitron bath.

In the above cases, the cloth after receiving the mordant paste is dried and put through a mixture of cow-dung and warm water. It is then put into the dyeing-vat or copper.

Fugitive Colours.

All the above colours are given, by making decoctions of the different colouring-woods; and receive the slight degree of fixity they possess, as well as great brilliancy, in consequence of their combination or admixture with the nitro-muriate of tin.

1. *Red,* is frequently made from Brazil and peachwood.

2. *Black,* a strong extract of galls and deuto-nitrate of iron.

3. *Purple,* Extract of logwood, and the deuto-nitrate.

4. *Yellow,* extract of quercitron bark, or French berries, and the tin-solution.

5. *Blue,* Prussian blue and solution of tin.

Fugitive colours are thickened with gum-tragacanth, which leaves the cloth in a softer state than gum-Senegal; the goods sometimes being sent to market without being washed."

The account published by Dr. Ure, in No. XII of the Journal of the Royal Institution, of some Experiments made on the body of a criminal, of the name of Clydesdale, immediately after execution at Glasgow, about three years since, is too well known to need our repeating it here, although an account of these experiments in his dictionary, under the article Galvanism, is of course appropriate; but as the Dr. has added to that account some further observations on this interesting subject, it

may not be inappropriate to lay them before our readers; and, with this extract, we must close our notice of this volume at the same time, by strongly recommending it as a valuable addition to chemical literature.

"In the preceding account I had accidentally omitted to state a very essential circumstance relative to the electrization of Clydesdale.

"The positive pole or wire connected with the zinc-end of the battery was that which I applied to the nerve; and the negative, or that connected with the copper-end, was that which I applied to the muscles. This is a matter of primary importance, as the following experiments will prove. Prepare the posterior limbs of a frog for voltaic electrization, leaving the crural nerves connected, as usual, to a detached portion of the spine. When the excitability has become nearly exhausted, plunge the limbs into the water of one wine glass, and the crural nerves with their pendant portion of spine into that of the other. The edges of the two glasses should be almost in contact. Then taking a rod of zinc in one hand, and a rod of silver (or a silver tea-spoon) in the other, plunge the former into the water of the limbs'-glass, and the latter into that of the nerves'-glass, without touching the frog itself, and gently strike the dry part of the metals together. Feeble convulsive movements or mere twitching of the fibres will be perceived at every contact. Reverse now the position of the metallic rods; that is, plunge the zinc into the nerves'-glass, and the silver into the other. On renewing the contact of the dry surfaces of the metal now, very lively convulsions will take place; and if the limbs are skillfully disposed in a narrowish conical glass, they will probably spring out to some distance. This interesting experiment may be agreeably varied in the following way, with an assistant operator:

let that person seize in the moist fingers of his left hand the spine and nervous cords of the prepared frog; and in those of the right hand a silver rod; and let the other person lay hold of one of the limbs with his right hand, while he holds a zinc-rod in the moist fingers of the left. On making the metallic contact, feeble convulsive twitchings will be observed as before. Holding still the frog as above, let them merely exchange the pieces of metals. On renewing the contacts, now lively movements will take place, which become very conspicuous, if one limb be held nearly horizontal, while the other hangs freely down. At each touch of the voltaic-pair the drooping limb will start up and strike the hand of the experimenter.

"It is evident, therefore, that, for the purpose of resuscitating dormant irritability of nerves, or contractility of their subordinate muscles, the positive pole must be applied to the former, and the negative to the latter. I need scarcely to suggest, that to make the above experiments analogous to the condition of a warm-blooded animal, apparently dead, the frog must have its excessive voltaic sensibility considerably blunted, and brought near the standard of the latter before beginning the experiments. Otherwise that animal electroscope, incomparably more delicate than the gold leaf condenser, will give very decided convulsions with either pole."

Polytechnic and Scientific Intelligence.

Royal Society.

SINCE our last, the First Part of the Transactions of this Society for the current year has been published. It contains the following papers:

On the Black Rete Mucosum of the Negro being a Defence against the scorching effects of the Sun's Rays. By Sir E. Home, Bart.

To prove that the *black rete mucosum* of the negro is a defence against the scorching effects of the sun's rays, Sir E. Home made the following experiments:

Exp. 1.—In August 1821, I exposed the back of my hand to the sun, at twelve o'clock, with a thermometer attached to it; another thermometer being placed upon a table, with the same exposure. That on my hand stood at 90°, the other at 102°. In 45 minutes blisters rose and coagulated lymph was exuded, which became vascular under my eye: the pain was very severe.

Exp. 2.—I exposed my face, my eyelids, and the back of my hand to water heated to 120°: in a few minutes they became painful; and when the heat was farther increased, I could not bear it.

Exp. 3.—I exposed the backs of my two hands to the sun's rays, with a thermometer upon each; the one hand was uncovered; the other had a covering of black cloth, under which the ball of the thermometer was placed. After ten minutes, the degree of heat of each thermometer was marked, and the appearance on the skin examined. This was repeated three different times. The

1st time the thermometer under the cloth was	91°	the other	85°
2d time	94°	. . .	91°
3d time	106°	. . .	98°

In every one of these trials the skin was scorched that was uncovered; the other had not suffered in the slighest degree; there was no appearance of perspiration on either hand.

Exp. 4.—The back of a negro's hand was exposed to the sun with a thermometer upon it, which stood at

100°; at the end of ten minutes the skin had not suffered in the least.

Exp. 5.—During the eclipse of the sun, September 7, 1820, I exposed the back of my hand to the rays, concentrated by a double lens of half an inch focus, at three different periods of the eclipse. When the heat to a thermometer was 75°, that is from forty-seven to fifty-seven minutes past one o'clock, the concentrated rays fell warm but gave no pain, although applied for ten minutes.

When the heat to a thermometer was 79°, that is at fifteen minutes past two o'clock, the concentrated rays in four minutes gave pain; in five minutes blistered the skin and produced dots of coagulable lymph which became vascular under the eye.

When the heat to a thermometer was 82°, that is half past two o'clock, the concentrated rays in three minutes gave pain; in four the part was blistered, and the pain could no longer be endured.

Exp. 6.—September 8, 1820, at eleven o'clock, the heat in the sun 90°; the concentrated rays applied to my naked arm produced a vesicle. This experiment was repeated when the heat was 84°, and in seven minutes a blister formed on the arm.

Exp. 7.—September 9, eleven o'clock, the thermometer in the sun at 90°. The concentrated rays applied to a piece of black kerseymere cloth made tight round my arm for fifteen minutes, gave me no real pain and left no impression whatever on the skin, although the nap of the cloth had been destroyed.

This experiment was repeated with white kerseymere, the heat at 86°; in fifteen minutes a blister was formed.

Repeated with Irish linen, the thermometer 86°. In fifteen minutes a blister was formed, and coagulable lymph thrown out, which had become vascular.

The same experiment was made with a handkerchief loose upon the hand, the heat 83°. In fifteen minutes an inflammatory blush was produced over a surface of several inches extent, which almost immediately disappeared on withdrawing the hand from the sun's rays.

Exp. 8—September 12th, the sun's heat at noon 85°. The concentrated rays applied to the back of the hand of a negro from Grenada, for fifteen minutes, produced no visible effect; at the first moment he felt a stab going inward, but that went off, and afterwards he had no pain.

From these experiments, observes Sir E. Home, it is evident that the power of the sun's rays to scorch the skin of animals is destroyed, when applied to a black surface, although the absolute heat in consequence of the absorption of rays is greater.

I have stated the fact of the scorching power of the sun's rays being destroyed, when they are applied to black surfaces, but have not gone further. Sir Humphry Davy, to whom I showed these observations, immediately explained it. He said that the radiant heat in the sun's rays was absorbed by the black surface, and converted into sensible heat.

Although these experiments, as far as they go, tend to support the conclusion drawn by Sir E. Home, we by no means think them decisive of the question. The thickness of the cuticle of the negro, the comparative irritability of the negro constitution, and that of the European white, and, indeed, many other considerations will induce us to pause before we admit as undoubted the conclusions which have been drawn.

On the Magnetic Phænomena produced by Electricity. By Sir Humphry Davy, Bart.

This is a valuable paper, but is not susceptible of

abridgement. Sir Humphry, at the conclusion of the paper, points out *a simple mode of making powerful magnets;* namely, by fixing bars of steel across, or circular pieces of steel fitted for making horse-shoe magnets, round the electrical conductors of buildings in elevated and exposed situations.

In a note the worthy president adds, "without meaning to offer any decided opinion on that gentleman's [M. Ampere.] ingenious views, I shall beg permission to mention two circumstances which seem to me unfavourable to the idea of the identity of electricity and magnetism: 1st. the great distance to which magnetism is communicated by common electricity; (I found a steel bar was made magnetic at fourteen inches distance from a wire transmitting an electric shock from about seventy feet of charged surface) and 2d, that the effect of magnetizing at a distance by electricity, takes place with the same readiness through air and water, glass, mica or metals; *i. e.* through conductors and non-conductors."

A Communication of a Singular Fact in Natural History. By the EARL OF MORTON.

Particulars of a Fact nearly similar to that related by Lord Morton. By DANIEL GILES, ESQ.

Microscopical Observations on the Brain and Nerves, shewing that the Materials of which they are composed exist in the blood;—on the Discovery of Valves in the branches of the vas breve, lying between the villous muscular coats of the Stomach;—and on the Structure of the Spleen. By SIR E. HOME, BART.

THIS paper is deserving the attention of Physiologists. The spleen, whose uses have hitherto been by anatomists unknown, Sir E. Home informs us, appears from its mechanism to be a reservoir for the superabundant serum, lymph, globules, soluble mucus, and colouring matter,

carried into the circulation immediately after digestion is completed.

On two new compounds of Chlorine and Carbon, and on a new compound of Iodine, Carbon, and Hydrogen. By MR. FARADAY.

An Account of the Comparison of various British Standards of Linear Measure. By CAPT. KATER.

An Account of the Urinary Organs, and Urine of two species of the Genus Rana. By JOHN DAVY, M.D.

An Account of a Micrometer made of Rock Crystal. By G. DOLLAND.

On the best kind of Steel, and Form for a Compass Needle. By CAPT. KATER.

After numerous experiments as to the material, form, polish, and other circumstances connected with the power and sensibility of the needle, which it would be scarcely possible to abridge, Capt. Kater arrived at the following conclusions, which are given in his own words.

"That the best material for compass needles is *clock spring;* but care must be taken in forming the needle to expose it as seldom as possible to heat, otherwise its capability of receiving magnetism will be much diminished.

"That the best form for a compass needle is the *pierced rhombus*, in the proportion of about five inches in length to two in width, this form being susceptible of the greatest directive force.

"That the best mode of tempering a compass needle is, first, to harden it at a red heat, and then to soften it from the middle to about an inch from each extremity, by exposing it to a heat sufficient to cause the blue colour which arises again to disappear.

"That in the same plate of steel, of the size of a few square inches only, portions are found varying consi-

derably in their capability of receiving magnetism, though not apparently differing in any other respect.

"That polishing the needle has no effect on its magnetism.

"That the best mode of communicating magnetism to a needle appears to be by placing it in the magnetic meridian, joining the opposite poles of a pair of bar-magnets (the magnets being in the same line), and laying the magnets so joined, flat upon the needle, with their poles upon its centre; then, having elevated the distant extremities of the magnets, so that they may form an angle of about two or three degrees with the needles, they are to be drawn from the centre of the needle to the extremities, carefully preserving the same distance from the needle. The operation is to be repeated 10 or 12 times on each surface.

"That in needles from five to eight inches in length, their weights being equal, the directive forces are nearly as the lengths.

"That the directive force does not depend upon extent of surface, but in needles of nearly the same length and form as the mass.

"That the deviation of a compass-needle, occasioned by the attraction of soft iron, depends, as Mr. Barlow has advanced, on extent of surface, and is wholly independent of the mass, except a certain thickness of the iron, amounting to about two-tenths of an inch, which is requisite for the complete developement of its attractive energy.

Notice respecting a Volcanic appearance in the Moon. By CAPT. KATER.

A further account of Fossil Bones discovered in Caverns, inclosed in the Limestone Rocks, at Plymouth. By JOSEPH WHIDBEY, ESQ.

On the Aëriform compounds of Charcoal and Hydrogen; with an account of some additional Experiments on the Gases from Oil and from Coal. By WILLIAM HENRY, M.D.

THIS is a valuable paper, a slight notice of which will be found in our VIIIth Number, It is not very easy to give an abridgement of it.

On the Results of Experiments on the Gas obtained from whale oil, Dr. Henry observes that "the gas obtained at different times from oil of the same quality, is far from being of uniform composition, and that great differences as to its specific gravity and chemical properties, are occasioned by the temperature at which it is produced. So far as my experience goes, no temperature short of ignition is sufficient for the decomposition of oil into permanent combustible gases; but the lower the heat that is employed, provided it be adequate to the effect, the heavier and more combustible is the gas, and the better suited to artificial illumination.

A Table, exhibiting the characteristic Properties of different Combustible Gases.

NAMES OF GASES.	Sp. Gr. Air 1000	100 vols. require of oxygen.	Total.	Diminished by firing.	Carbonic acid produced.
Olefiant Gas	.970	350	400	$200\frac{1}{2}$	200
Carburetted Hydrogen.	.506	200	300	$200\frac{2}{3}$	100
Hydrogen Gas . . .	.069	50	150	$150\frac{1}{3}$	0
Carbonic oxide . . .	.972	50	150	$50\frac{1}{3}$	100

The following papers have been read at this Society since our last report.

July 5,—On the Magnetic Phenomena produced by Electricity, and their relation to Heat occasioned by the same agent. By SIR H. DAVY.

July 12.—An Investigation of some Theories relating to the Theory of the Earth, &c. By M. Wronski.

On the Peculiarities of the Manatee, of the West Indies. By Sir E. Home.

On a new Compound of Chlorine and Carbon. By Messrs. R. Phillips and M. Faraday.

This compound was brought to England by M. Julin, of Abo, in Finland, having been formed during the distillation of green vitriol and nitre for the production of nitric acid. It is a solid crystalline body, fusible and volatile by heat without decomposition, and condensing into crystals. It is insoluble in water but soluble in alcohol, ether, and essential oils. It sinks in water. It burns with a red flame, giving off much smoke and fumes of muriatic acid gas. Acids do not act on it. When its vapour is highly heated in a tube, decomposition takes place, chlorine is given off, and charcoal deposited. Potassium burnt with it forms chloride of potassium and liberates charcoal. Its vapour, detonated with oxygen over mercury, formed carbonic acid and chloride of mercury; passed over hot oxide of copper it formed a chloride of copper and carbonic acid; and over hot lime it occasioned ignition, and produced chloride of calcium and carbonic acid. It consists of one portion of chlorine and two portions of carbon: hence it is a sub-chloride of carbon. All attempts to form it by other means have hitherto failed.

Fig Trees.

At Tarring, near Worthing, there is an orchard of fig-trees, where the fruit grows on standard trees, and ripens as well as in any part of Spain. These trees are so regularly productive as to form the principal support

of a large family. Although the orchard does not exceed three quarters of an acre it contains upwards of 100 trees from which the proprietor gathers about 100 dozen per day during the season, estimating each tree to produce about 20 dozen. PHILLIPS'S *Pomarium Britannicum.*

On the Production of Colours by Mechanical Division.

MR. J. P. CHARLTON, in the course of some experiments upon enamel colours, has been led to observe the fact that oxygenation is not essential to the rose colour which gold imparts to enamels, but that the change of colour is produced merely by mechanical comminution. To prove this, grind together one part of metallic gold with twenty parts of common enameller's flux; a rose-coloured enamel, without the slightest metallic appearance, will be the result: the gold must be in that friable state, sold by refiners, to which it is reduced by some process not generally known.

On promoting the early Puberty of Apple and Pear Trees, when raised from Seed, by J. WILLIAMS, Esq.

MANY persons have been deterred from raising new varieties of fruit-trees from seed, by the great length of time requisite for ascertaining the result of their industry; the apple, when raised in the common way, from the kernel, rarely affords its first blossoms before it is eight or ten years old; and the pear-tree requires even a longer period: twelve or fifteen summers often elapsing before the leaves of seedling trees are capable of forming their first blossom buds. In November and December, 1809, I sowed the kernels of several ripe pears in separate pots, and placed them in a green-house during the winter. They began to vegetate in the following month of

February, and in March the pots were removed into my grapery, where they remained till midsummer. The plants were then carefully removed into a seed-bed, and planted in rows about fourteen inches apart, where they remained till the autumn of 1811, when they were again transplanted into a nursery, at distances of six feet. Every succeeding winter I pruned away all small trifling lateral shoots, leaving the stronger laterals at their full length to the bottom of the plants, and made such a general disposition of the branches, as that the leaves of the upper shoots might not shade those situated underneath; every leaf, therefore, was thus rendered an efficient organ by its full exposure to the light. At the height of about six feet, I had the satisfaction to observe that the branches ceased to produce thorns, and the leaves began to assume a more cultivated character. Several of these trees afforded blossoms and fruit last year. One seedling Siberian variety of the apple, thus treated, yielded fruit at four years old, and many more at the age of five and six years.

Gas from Cocoa-Nut Oil.

A LARGE quantity of this oil has been lately imported into this country. It has rather a pleasant smell, and is about the consistence of butter. Messrs. Taylor and Martineau have lately used it for the production of gas, which gives an extremely brilliant and white light by combustion. It is said that it may be employed economically for this purpose, and on account of its solid form, and pleasant smell, it is very preferable to the oil commonly used, and especially in private houses.

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n the best Method of raising Apple-trees for Orchards.

IN raising apple-trees, either for cyder or for the table,

the wild crab kernels are said to be the best; but the seeds obtained from apples after the cyder is pressed out of them, will produce young plants equally useful with the crab; some of which will, no doubt, yield many new varieties of fruit; but it is not, in general, wise to trust to the accident or to wait for the uncertainty, when a decisive mode of obtaining what kind of fruit you might choose can be adopted by *grafting*.

Let the space in which every tree is designed to stand in the orchard about to be planted, be well dug about one foot deep, and in a circle of about eight or ten feet diameter. Then let a proper quantity of apple-seed be strewed over each circle, and let the earth be raked over the seed, so as to cover it properly. This process may be effected any time between November and March We think November the best time. During the next year, a great variety of plants will grow up in each circle; as the summer proceeds, let the weak and small plants be pulled up, so as to make room for the strong and vigorous ones. The next year, let them be farther reduced, so that if there be in each circle half a dozen, or at most ten, vigorous plants, there will be more than enough. The third or fourth year, they may all be grafted; and in the course of a year or two, the strongest and best graft in each of the circles being suffered to remain, the rest must be either thrown away, or removed to other plantations; and we do not hesitate to affirm, that a valuable orchard may be reared more early by many years than by the plans now usually adopted: for do what we will, *transplantation*, in general, retards the growth of trees two or three, and sometimes many years.—*Family Cyclopædia.*

Sailing Carriage.

A MACHINE, invented by a gentleman of Christ College,

Cambridge, was lately tried at Newmarket. In shape it is nearly that of an isosceles triangle, and it moves with the broad end forward, on four wheels. It has a boom 32 feet long, and an exceeding high mast. It will carry twelve persons at the rate of 30 miles an hour. To the axle of the hinder wheels is fixed a rudder. It can go on a wind and tack as a vessel at sea; and is capable of being so correctly guided, that the pilot, at pleasure, can run the wheels over a stone.

Efficacy of Galvanism to maintain the Process of Digestion.

THE disputes respecting the power of galvanism to maintain the process of digestion in a rabbit, after the eighth pair of nerves has been divided in the neck, seem to be finally determined, by the results of an experiment (in which the efficacy of that agent was proved) lately performed at the Royal Institution by Dr. WILSON PHILIP. The nerves were divided in a rabbit, soon after it had eaten copiously of parsley; galvanism was employed in the way recommended by Dr. Philip, and the animal died at the end of seven hours. The contents of the stomach were immediately afterwards exposed, and presented appearances similar to those which would be observeable in the contents of a healthy rabbit killed at the same period after having eaten of the same food. The digestive process had not, perhaps, advanced quite so far in the subject of the experiment as in a healthy rabbit; but the difference, if there was any, was not strikingly remarkable.

New Chemical Apparatus.

AN apparatus has been invented at Glasgow, for the manufacture of any mineral water requiring to be charged

with carbonic acid gas, which amounts, in fact, to the developement of a power hitherto unknown, but equal to that of steam. This machine is described as having neither gasometer nor air-pump, yet the strength of a boy is asserted to be capable of compressing into any vessel, from thirty to forty atmospheres of gas, in a few minutes; while, to effect the same with a forcing-pump, would occupy the strength of several men as many hours. A machine, equal in force to an engine of forty-horse power, and requiring neither fire nor water, would not occupy a space of more than four feet square. For many purposes it would be more applicable than steam; but, by reason of the present price of sulphuric acid, greatly more expensive. This has hitherto prevented Dr. M'Gavin, for whom the apparatus was constructed by Mr. Charles Cameron, of Glasgow, from attempting to apply it to the propelling of vessels.

To Restore and Improve Musty Flour.

THIS very important discovery was made by E. Davy, Esq. of the Cork Institution. He found that the carbonate of magnesia in small quantity had the property of restoring to its primitive state, flour which has a musty smell and taste, from dampness and other causes.

"One pound of the carbonate of magnesia, [common magnesia of the shops] is to be combined with two hundred and fifty pounds of musty flour; that is, in the minor proportion of thirty grains of the carbonate to one pound of flour. It is to be leavened and baked in the usual way of making bread. The loaves will be found to rise well in the oven, to be more light and spongy, and also whiter than bread in the common way It will likewise have an excellent taste, and will keep well.

"*Observation.*— The use of magnesia in bread-making is

well worthy the attention of the public: for, if it improves *musty* flour, how must it improve bread in general?—As to bakers they may be deterred from its use by the general legislative prohibition of drugs in bread-making; but farmers and families in the country who make their own bread, will no doubt be glad to adopt so cheap a process of improving their flour as the above. The use of magnesia in bread, independent of its improving qualities, is as much superior to that of alum, as one substance can be to another."—*Mackenzie's Chemistry.*

FRANCE.

The Society of Apothecaries of Paris have offered a prize of 600 francs, 1st, For the best determination in what manner charcoal acts in decoloration, and, in consequence, what are the changes it undergoes in its composition during its re-action. 2dly, What is the influence exercised during the operation by any foreign substance which charcoal may contain; and 3dly, To establish whether the physical state of animal charcoal is not one of the essential causes of its more marked action on colouring substances.

A prize of 300 francs will also be given for the best vegetable analysis; such analysis to be made on a substance used in medicine or in the arts. The time fixed is limited to the first of April, 1822.

On the Theory of Vision.

Some considerations on the *Theory of Vision* have been lately made public in a memoir read to the Academy of Sciences at Paris, by M. Vallee, which contain two or three important novel facts, and several notions, in reality conjectural, but which are nevertheless interesting and plausible.

Mr. Vallee has ascertained, by means of an instrument of his invention, which he terms an *optochrometer*, that objects, as they recede from the eye, begin to become distinctly seen at distances which are different according to diversities in their colours. He has also proved, he says, by the same instrument, that the vitreous humour has a greater refractive power towards the posterior part of the eye, than it has nearer to the crystalline. These points, and some notions respecting the *perception* of impressions on the iris, and the causes of the variation in the degree of contraction of this organ, constitute the basis of what he regards as a theory of vision.

Let us suppose, then, Mr. Vallee says, that a point, A, [Plate XV. fig. 7.] is situate in the optic axis of an eye, M N; the focus of a crystalline extracted from its capsule being always very near its centre, it is evident that the rays which pass from the lens, *m n*, will diverge in a point, *f*, situate some distance from the fundus of the eye, if the vitreous humour were replaced by air: but, this humour being denser than air, it will lengthen the focal distance, and its refractive power augmenting as the crystalline is receded from, the refracted rays will gradually approach each other and the optic axis, by describing curved lines; at a certain distance they will all unite in one line, and, this line falling on the retina at a point, *a*, this point will be the image of the point A. It is seen, then, that the image will have no diffusion like that which deviation from sphericity would produce; and the different routes taken by diversely coloured rays not preventing their all uniting in the optic axis to be no more separated, (because, after their re-union, they traverse perpendicularly the strata of the vitreous humour,) it is obvious that the colour of the point A will be completely reproduced at *a*. The

eye, in this respect, will therefore be achromatic. The point A, too, may be still more remote without its image *a*, ceasing to be accurate. If the point A, instead of being in the optic axis, were but a little without it, the phenomena will take place nearly in the same manner, and the correspondent image will still be accurate and exempt from diffusion. But, if the point should be considerably remote from the optic axis, each cone of rays transmitted from a circle of the pupil will not be changed into other cones, by passing through the strata of the vitreous humour that it may traverse: the re-union of all the rays in one line will not, then, take place in a precise manner, and the correspondent image will be diffused and aureolated. It follows, thence, that the image which is impressed on the retina at the greatest prolongation of the optic axis, is that which is best adapted for vision: so we always direct the eye in this way to the objects we regard, which practice itself tends to develope a greater degree of sensibility at the point *a*, than elsewhere. This particular sensibility becomes then a new means for the direction of the optic axis; but, as the infant is devoid of this means, nature, Mr. Vallee says, has supplied it by another.* The yellow spot, discovered by SOEMMERING, appears to be calculated for this object: it decreases in intensity as the optic axis is diverged from, and, by this condition, it is exactly qualified to give to the image a degree of intensity which increases in proportion as the image approaches the point *a*, which necessarily makes us sensible how the eye should be turned to make the image fall on this point. If it be considered that the eye changes its position when vision is changed from one point to another point even extremely

* The observations and arguments used here are precisely those of Mr. Vallee.

near to the former, we shall be convinced that the eye must be provided with some organ by which it judges of the smallest differences of position of the optic axis. The foramen in the centre of the yellow spot, which has been supposed to be in the centre of the optic axis, is the organ in question, according to Mr. Vallee.

The utility of the contraction of the pupil has been long known. Instances have occasionally occurred of the existence of voluntary power over the motions of the iris: Mr. Vallee says, he has himself attained this power. By directing the optic axis along a rule, examining successively all the lines on it, often repeating this exercise, (in which the pupil is dilated and contracted, according as the sight is fixed on a point more or less remote,) and *studying very attentively his sensations*, he has acquired a consciousness of the movements of the iris, and, at length, the faculty of dilating and contracting it. By this result he has ascertained that an effort is necessary in order to act on the iris; and he considers that this effort is determined by the impression of a greater or less degree of light on the retina, and the necessity for modifying the degree of light according to external circumstances: the iris actively dilating (that is, *contracting the pupil,*) as an object is brought nearer to the eye, because the object sends to the eye more and more light as it approaches the organ.

As the use of the eye is founded on an examination and comparison of the sensations it experiences, and of those acquired by *touch*, it is obvious that the constant relation (other circumstances being equal,) of the size of the pupil to the distance of objects must be recognized; and, consequently, the effort which maintains the pupil of that size when the eye is fixed on an object, gives the measure of the remoteness of the object. Thus,

medium of a given degree of light, when we have taken notice of the objects around us, the dimension of the pupil of an eye directed on any point of those objects is determined in a ratio to the intensity of the light of the medium, (because of the more or less lustre of the bodies of which images are impressed on the retina,) and in a ratio, also, of the distance of the object regarded; or, in other words, of the degree of divergence of the rays which arrive at the eye from that object: the iris, then, gives the measure of this divergence.

It is known, (it may be remarked in support of those notions,) that we judge of distance less accurately with one eye, (the perception being less intense,) than with both; and, when a person loses the sight of one eye, from any accident, he judges less correctly of distance at first than after a certain time: it is probable that this period is the time which is necessary for the perception which gives the measure of distance, acquiring all the perfection of which it is susceptible.

This appreciation of distance, however, can serve only for near objects; for, with regard to such as are remote, the divergence of the rays sent from them to the eye does not sensibly vary. For great distances, the organ of sight has another measure: the images formed at the fundus of the eye, without varying in intensity, decrease in size as the object recedes; now, in proportion as the image diminishes in size, it makes a less sensible impression on us; and, when this image is of a certain smallness, it is no longer sensible. The different parts of objects should, then, disappear to us according to their size, at different distances. Hence, as soon as we have acquired sufficient knowledge of objects, we judge of their remoteness by the size of such of their parts as no longer make sensible impressions on us.

New Patents Sealed in 1821.

To Fred. M. Van Heythuysen, of Chancery-lane, for a new method of propelling small vessels or boats through water, and light carriages over land.—Sealed July 23d. —6 months for inrolment.

To Samuel Bagshaw, of Newcastle-under-Lyne, for a method of forming and manufacturing vases, urns, basins, and other ornamental articles which have been heretofore usually made of stone or marble, from a combination of materials never heretofore made use of in manufacturing such articles.—Sealed July 26th.—2 months for inrolment.

To John Manton, of Dover-street, Piccadilly, gun-maker, for improvements in the construction of locks to all kinds of fowling-pieces and fire-arms.—Sealed July 30th.—2 months for inrolment.

To Thomas Bennett, jun. of Bewdley, Worcestershire, builder, for certain improvements in steam-engines, or steam apparatus.—Sealed August 4th—6 months for inrolment.

To John Slater, of Birmingham, manufacturer, for certain improvements in making a kitchen range and apparatus for cooking and other purposes.—Sealed August 4th.—6 months for inrolment.

To William Henry Higman, of Bath, saddler and coach harness-maker, for certain improvements in the construction of harness, which he conceives will afford great relief to horses, in drawing carriages of various descriptions, and be of public utility.—Sealed August 14th.—2 months for inrolment.

To David Gordon, esq. of Edinburgh, for certain improvements in the construction of wheeled carriages.—Sealed August 14th.—6 months for inrolment.

To Jean Frederick Marquis de Chabannes, for a new method and apparatus for attracting and catching fish.—Sealed August 14th.—6 months for inrolment.

To John Collinge, of Lambeth, engineer, for improvements on cast-iron rollers for sugar-mills, by more permanently fixing them to their gudgeons.—Sealed August 14th.—4 months for inrolment.

To John Nichol, of West End, Middlesex, master-mariner, for an improved capstan, windlass, and hawse-roller.—Sealed August 22d.—2 months for inrolment.

To William Lane, of Birmingham, in the county of Warwick, jack-maker, for an invention of certain improvements on horizontal roasting-jacks, which improvements are applicable to other useful purposes.—Sealed August 23d.—2 months for inrolment.

To David Gordon, esq. of the city of Edinburgh, in the county of Edinburgh, at present residing in the town of Stranraer, for an invention of certain improvements in the construction of harness for animals of draft and burden.—Sealed Sept. 8th.—6 months for inrolment.

To Bevington Gibbins, of Melin Crythen Works, near Neath, Glamorganshire, chemist, and Charles Hanning Wilkinson, of Bath, in the county of Somerset, doctor of medicine, for an invention of an improved retort, or vessel for making coal and other gas, and for the distillation, evaporation, and concentration of acids and other substances.—Sealed Sept. 8th.—2 months for inrolment.

To Richard Francis Hawkins, of Plumstead, in the county of Kent, master-mariner, for an invention of certain improvements in the construction of anchors.—Sealed Sept. 11th.—6 months for inrolment.

To Dominique Pierre Deurbroucq, of King-street, Soho, in the county of Middlesex, gent. in consequence of a communication by a certain foreigner resident abroad, for an apparatus for the purpose of condensing the alcoholic steams arising from spirituous liquors, such as wine, brandy, beer, cyder, &c. during their fermentation.—Sealed Sept. 11th.—6 months for inrolment.

To William Losh, of Newcastle-upon-Tyne, for an invention of certain improvements in the construction of iron rails or railways.—Sealed Sept. 14th.—2 months for inrolment.

ERRATA IN NO. X.

Page 256, line 20, for "Morintures" read "Mountures."
———— next line, for "draw-box" read "draw-boy."
—— 259, fifth line from bottom, erase the word "*rotatis.*"
—— 260, line 7, for "morinture" read "mounture."
———— line 13, the same.
———— line 14, for "draw-box" read "draw-boy."

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Fig. 5

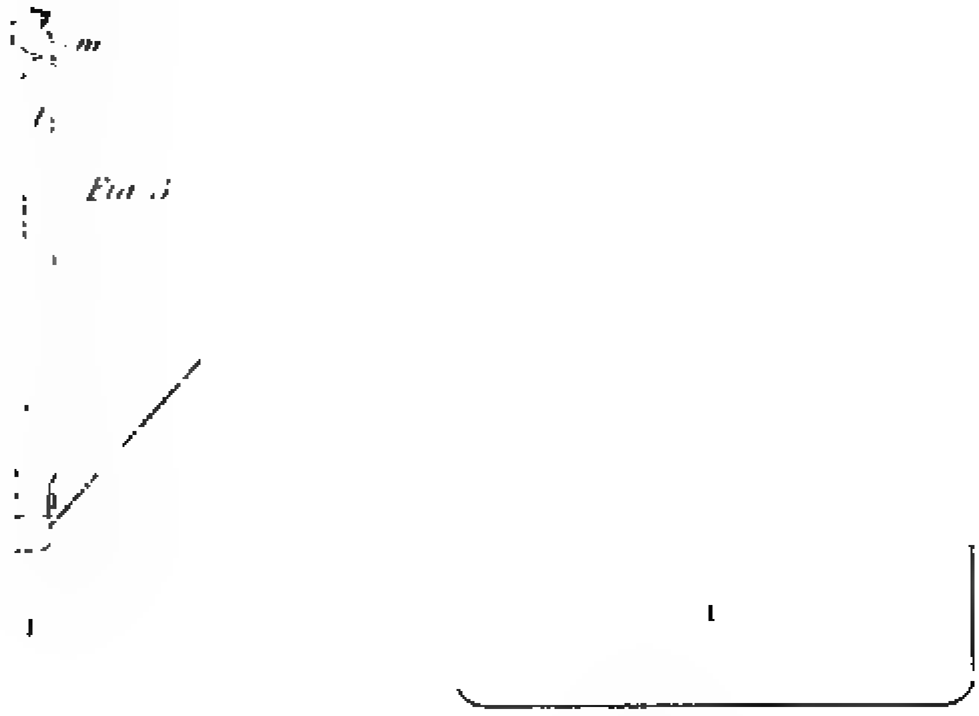

Fig. 1

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No. XII.

Recent Patents.

To Charles Phillips, *of Albemarle Street, Piccadilly, London, Commander in the Royal Navy, for certain Improvements in the Apparatus for propelling Vessels; and an Improvement in the construction of Vessels so propelled.*

This invention is a method of propelling vessels on water by means of paddle-wheels which revolve horizontally. It embraces also a method of constructing and applying moveable paddles, which are made to descend into the water at that point of the wheel's revolution where the paddle is to be brought into the action of rowing, and to ascend again out of the water when the full effective stroke is given. It is proposed to enclose between decks, all but the paddles in immediate operation; by which contrivance, it is conceived, that vessels may be propelled in high or rolling seas with greater effect,

and will hence, be more safe and suitable for general sea-service.

Plate XVII. fig. 1. exhibits a side view of part of a vessel upon this improved construction, with the edge of one wheel and its apparatus, as proposed to be attached. Two of these wheels are to be applied and placed horizontally on opposite sides of the vessel, which are to be connected by means of geer to the operative part of a steam engine, or other moving power. Each horizontal wheel is intended to carry eight paddles, one of which is seen at *A*, with its frame elevated and out of action, just emerging from its inclosure between decks. The next paddle is omitted in the view, in order to enable *A* to be seen without obstruction. *B*, shews the third paddle lowered into the water and in action; the fourth paddle is also omitted; and the fifth, *C*, is seen as the first, with its frame raised up out of action, and just entering the inclosure between decks; *a*, *a*, *a*, is the horizontal wheel carried round upon antifriction rollers, which run upon a ring under the wheel shewn by dots. This ring is supported by framing, and partly by the bulging rail, *b*, *b*; but which rail is principally intended to defend the paddles from external injury: *c*, is a projection, formed as a segment of a circle, extending from the side of the vessel, with a curved groove, *d*, *e*, *f*.

The force of steam, or any other moving power, being converted into a rotatory motion, is communicated to the shaft of the horizontal wheel, *a*, and hence causes the wheel with its paddles to revolve. The form of the paddle and its appendages are shewn in fig. 2, a front view, and fig. 3, its edge. At the lower part of the paddle frame *B*, fig. 1, will be seen a chain attached, which is carried up and passed over a pulley on the top of the standard, *g*; this chain also passes over a pulley at the end of the

lever, *h*, and thence down to the back of the standard, to which its end is secured. It will now be evident that, if the pulley at the end of the lever, *h*, recedes from the standard, *g*, the chain which passes over the pulley will be drawn up, and with it the paddle. On the contrary, when the lever approaches the standard, the chain and the paddle will be lowered. This is produced by means of the curved groove, *d*, *e*, *f*, before mentioned, against which a roller, *i*, upon an arm of the lever, is made to work, so that, when the roller *i*, approaches the curved part of the groove at *d*, the lever begins to rise, and causes the paddle to descend. As the roller, *i*, passes along the straight part of the groove at *e*, the weight of the paddle *I*, keeps the lever *h*, erect, and the paddle down in the water; but when the roller *i*, comes against the curved part of the groove at *f*, then the lever is again depressed and the paddle drawn up.

It is presumed that the weight of the paddle will not be sufficient to carry it down instantly into the water when it becomes liberated as above; and also, that the buoyancy of the water will partly prevent it from sinking. To remedy this the following contrivance is proposed: the axle, *k*, fig. 2. is secured to the horizontal-wheel by means of two plummer blocks, which axle, passing through the loops, *l*, of the paddle-frame, enables it to rise and fall. Upon the axle *k*, is a pinion *m*, taking into the rack *n*, by means of which the paddle is raised and lowered. Near the end of the axle *k*, is another pinion, *o*, which, as the horizontal wheel revolves, is brought into action with the rack *p*, fixed upon the underside of the projecting frame. When the roller *i*, has arrived at that part of the curved groove marked *d*, the lever, as above said, rises and the paddle falls; at this time the pinion *o*, comes into the rack *p*, and as the wheel *a*, goes forward, causes the

axle to turn and work the pinion *m*, in the rack *n*, by which the paddle is instantly forced down into the water. In this situation the paddle is prevented from rising by a pall, *q*, falling into the racket-wheel, *r*, upon the end of the axle, *k*. But when the paddle has made its full stroke through the water, the end of the pall presses against a projection, which causes it to receive the ratchet-wheel, and the paddle then rises, partly by the buoyancy of the water, but finally by the roller *i*, arriving at that part of the curved groove marked *f*; which, as above said, causes the lever to recede and draw up the chain with the paddle, which then, as at *C*, enters the inclosed part of the vessel, and there traverses round until it comes again into the situation of *A*, and then descends into the water as described.

Each paddle being furnished with the same individual parts, and the combinations and arrangement of each being exactly similar, it is almost unnecessary to state that the motions and actions of each will be the same.

The improvements proposed in the construction of boats or other vessels to be propelled as above, consist in forming a sufficient recess while the vessel is building, to permit the paddle-wheels to revolve without obstruction. In this contrivance, in order to prevent the inconvenience which would take place from the water entering the vessel, a deck is made completely from side to side under both wheels; and also one above, which are secured tight, so that water may be permitted to run over or through the vessel without injury. And as there would be considerable inconvenience in working the paddle-wheels if exposed, they are to be enclosed within a wooden casing, leaving only the space open as shewn in fig. 1.

Certain alterations and modifications of the above apparatus are claimed as coming within the intention of the Patentee; but in order, particularly to identify the principle of this invention, it is declared to consist, "in placing or fixing the paddle or propelling wheels, however constructed, in a horizontal position, in any boats or vessels, &c."

Inrolled, July, 1821.

To JOHN REEDHEAD, *of Heyworth, Durham, and* WILLIAM PARRY, *of East Lane, Walworth, Surrey, for certain Improvements in Propelling Vessels.*

THESE improvements consist of two parts, first in the employment of several pairs of paddle-wheels for the purpose of propelling ships, boats, barges, &c.; and secondly, in a mode of enclosing or shutting up the said paddle-wheels in tempestuous weather; by which the ship, boat or barge may be converted into an ordinary vessel to be then propelled by canvas sails, acted upon by the wind.

In Plate XVII. fig. 4, is a representation of the side of a vessel upon the improved construction, in which *a, a,* are the entrance and exit apertures of a horizontal channel, which extends through the length of the vessel for the free passage of water, and is shewn by dots. Two of these horizontal channels are provided, one on each side of the vessel, and ballast or other lading is to be taken on board, so as to sink the hull, until the water line reaches near to the top of the apertures, *a, a.* Two or more pairs of paddle-wheels, shewn by dots in the fig. are to be mounted so that their lower parts may be immersed about one foot under the water which occupies the channel.

In this situation the wheels are made to revolve by means of a steam-engine or other first mover: by the paddles dipping into the stream which flows freely through the channel, the resistance of the water propels the vessel forward.

It will be seen that the channels are open fore and aft, for the purpose of giving free ingress and egress to the water. But, in the event of stormy weather or a high and rolling sea, these apertures are to be closed by sluice-gates, or sliding shutters; and, if necessary, the water is pumped out of the channels; by which means the wheels are closed in and put out of operation. The vessel then becomes, externally, the same as a sailing packet, and which, by setting canvas, may be propelled by the power of the wind upon its sails: under these circumstances it will be found as perfectly safe at sea in stormy weather as any other sailing vessel of the ordinary construction.

The specification concludes thus: "we have described the said water channels as passing through the hull of the vessel; but, under some circumstances, it may be found desirable to form trunks on the outside of the vessel, open at both ends, for the purpose of working the paddle-wheels therein, as above described. As we employ several pairs of propellers, we connect all the wheels on one side together by means of rods and cranks upon their axles; and all the wheels on the other side by the same means, so as to communicate the motion of the first pair to all the rest. We do not, however, confine ourselves to this or any other mode of connecting the wheels together so as to put them all in action, but employ geer, or a train of wheels, or any other means, none of which we claim as new or forming part of our invention."

Inrolled, November, 1821.

Mains, Improvements on Wheeled Carriages.

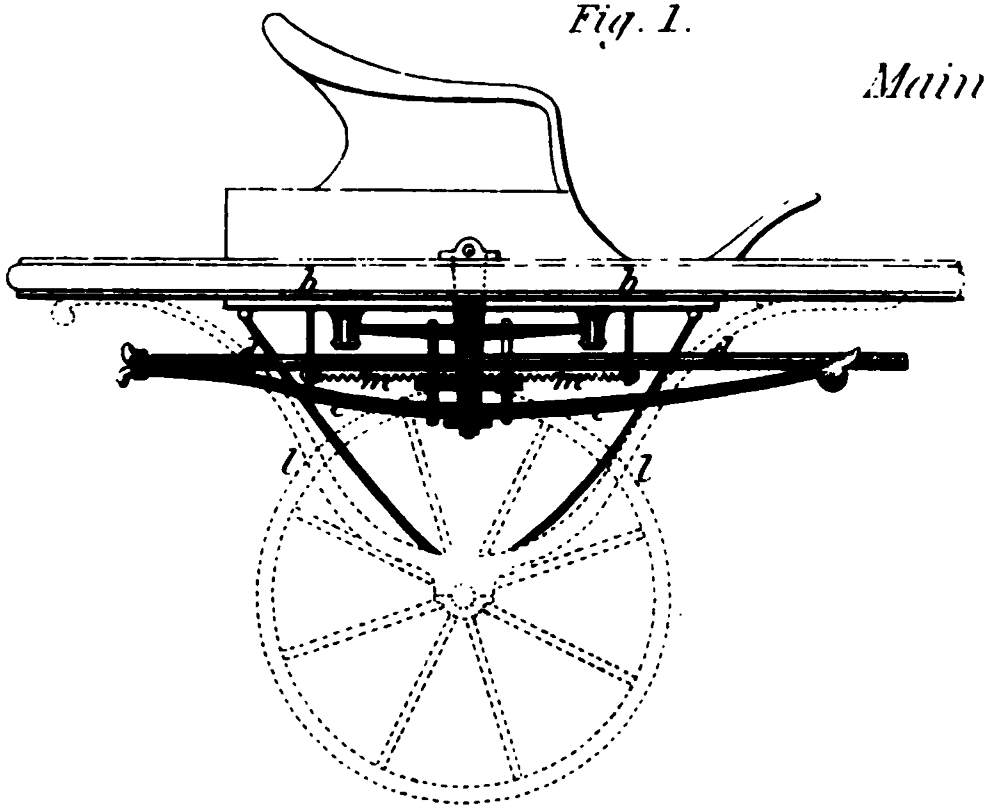


Fig. 1.

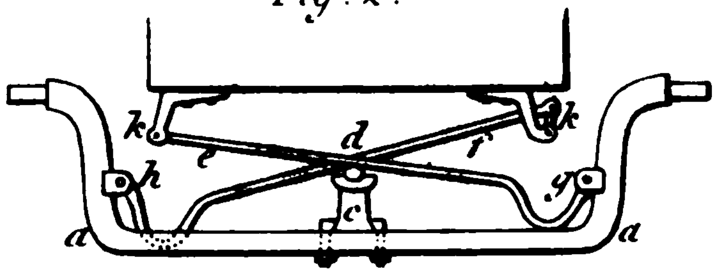


Fig. 2.

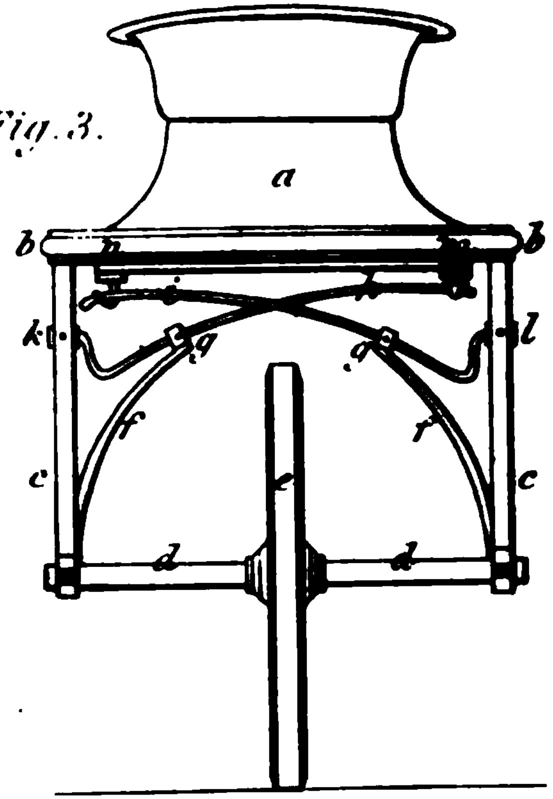


Fig. 3.

Higmans, Improvements on Harneſs

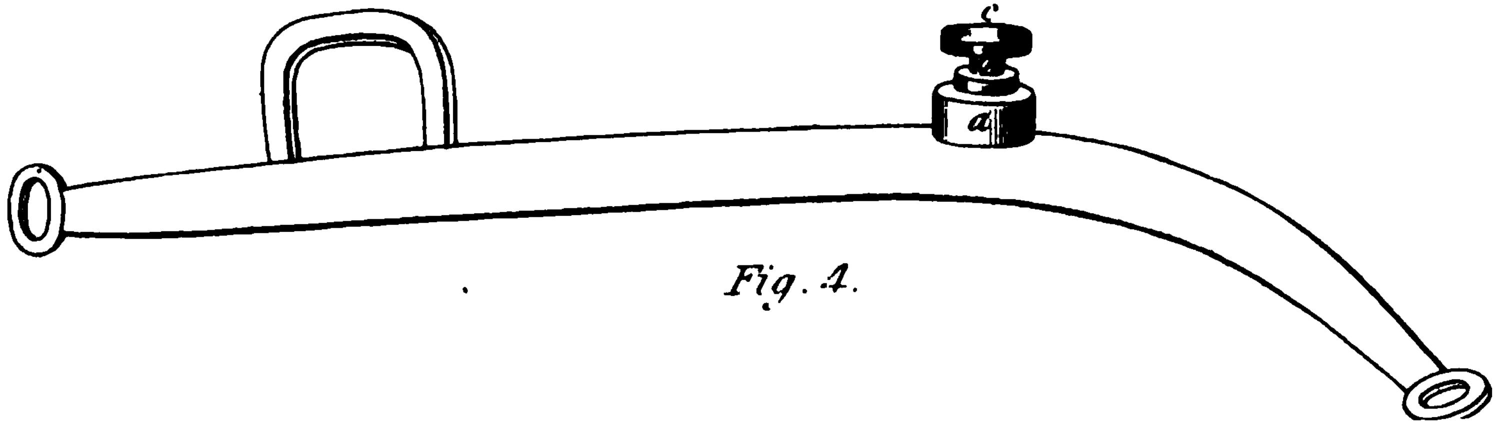


Fig. 4.

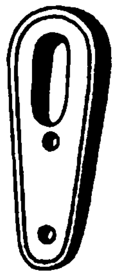


Fig. 5.

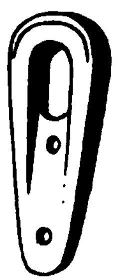


Fig. 6.

Fig. 7.

To Joseph Main, *Esq. of Bagnio Court, Newgate Street, London, for certain improvements on Wheeled Carriages.*

This invention consists of a new method of attaching the body of a coach, chariot, gig, or other vehicle to its frame or carriage, by means of levers, springs, straps, and other appendages, so disposed, in form and position, as to throw the whole weight of the load into the centre; that is, if the vehicle be constructed to go upon two wheels, the weight of the body is thrown exactly into the centre between the wheels, and directly over the axletree; if the carriage have four or more wheels, the weight is thrown into the central point between the several wheels; or else equally divided between the central points, between the several pairs of wheels. By this contrivance the erect and horizontal position of the body is, at all times, preserved, and its motions kept parallel to the position in which it was first suspended, so that, whether the load be placed in the centre, or on either side, the body cannot hang uneven.

In order to explain this improved mode of suspension, plate XIX. fig. 1, represents a side view of a gig or single horse chaise, upon two wheels, mounted or hung in its carriage upon the improved principle. The body, together with its several springs, levers, and other supporters, rests entirely upon the bent bar of iron, *a*, called the swivel-bar, which is supported by pivots on the frame or carriage, *b, b*. In the middle of the swivel-bar is attached the long spring, *c,c*, made of one piece, particularly strong, or of several leaves, as is usual in carriage springs. Immediately over this spring is applied a straight bar of iron or steel, *d, d*, called the bearing-bar, one end of which is fixed to the spring, *c*, the other end being supported by

an anti-friction roller, attached to the spring. Two levers are next applied, crossing the bearing-bar and spring at right angles, as seen at *e* and *f*, in the back view, fig. 2; their fulcrums being on opposite sides, at *g* and *h*, in brackets attached to the bent part of the bar, *a*. The middle of these levers rests upon the bearing-bar, *d*, and their ends are attached to cross-pieces, *i*, *i*, which hang in swivels, upon arms, *k*, *k*, extending from the under part of the body.

The object of this contrivance (as above said,) is, that the load, whether placed in the middle or on one side, will produce the same effect in depressing the body equally, by the weight being transferred to the centre bearing-bar: for if the end of either the lever *e*, or the lever *f*, be particularly pressed upon, the bearing-bar, *d*, at all times receiving the weight in the centre, will cause both the levers to descend together, so that the up-and-down motions of the body must be always parallel to each other. By thus transferring the whole weight of the body and its contents to the centre, the wheels may be placed nearer together, without the risk of overturning; this, in some cases, will be attended with advantage, as, in bad roads, such kind of carriage will be enabled to travel, by running within the ruts, when light carriages, of the ordinary construction, would be impeded.

The wheel-brackets, *l*, shewn by dots in fig. 1, may be fixed under the shafts in the usual way; and will be the same, whether an ordinary axletree and pair of wheels are used on the outside, at the usual distance, or within: that is, closer together. If the wheels be placed within the brackets, it is proposed to make the axletree a fixture to one of the wheels, so as to revolve with it, the other wheel being loose for the purpose of enabling the carriage to turn. In addition to the springs, &c. above described,

bracings will be necessary to keep the body in its proper situation. The up-and-down action, produced by the motion of the horse, being removed by the improved mode of suspension, and the horizontal position of the body being preserved, it will be necessaay to apply braces or springs on both sides of the swivel-bar as shewn at *m*, *m*, for the purpose of preventing an oscillating motion.

In order to keep the body from rising to an inconvenient height, by sudden jolts, and to prevent too much strain upon the springs, by the load being placed too forward, or too backward, the lower part of the body is braced to the axletree, by straps from the four extreme corners of the under-side of the body; these straps being sufficiently loose to admit of the several parts having their proper play.

When this invention is applied to carriages already built, with wheels in the ordinary situation, and the introduction of the swivel-bar may not be convenient, its place is to be supplied by a strong spring, crossing the carriage in the same direction as the swivel-bar; upon the middle of this spring is to be placed the long spring, *c*, with its bearing-bar, *d*, and all the other apparatus, as described above; or the long spring *c*, may be fixed [illegible] the ordinary axletree; but, in this case, the lever carri[illegible] *g* and *h*, may be attached to the shafts, or othe[illegible] most convenient.

The description above given, and the fig[illegible] to, relate only to the application of this in[illegible] a gig or one-horse chaise; it will, however, be [illegible] ceived, that the same contrivance is ap[illegible] vehicles: for, supposing the figures rep[illegible] carriages running upon four wheels, [illegible] whole operative part of the app[illegible]

with their supports, the swivel-bar, the bearing-bar, &c. as described, would need no alteration, excepting as to strength.

If the load is required to be disposed over the centres of several pairs of wheels, it is proposed to apply distinct sets of the above apparatus to each pair, still adhering to the principle of throwing the weight into the centre line, between the wheels of the carriage, by which the springs will be equally acted upon, whether the wheels are all upon level ground, or any one of them elevated or depressed; by thus keeping the centres of gravity in the centres between the wheels, the risk of overturning is evidently removed; and the capability of traversing roads, which, by reason of ruts, are nearly impassable to ordinary carriages, is, by means of the close situation of the wheels, upon the improved principle, effected.

The patentee, in his specifiation observes, that "In all vehicles, with two or more wheels, it is desirable to throw the load, as much as possible, into the centre, between those wheels; and therefore, in the above description, I have endeavoured to shew how effectually this may be done by my aforesaid invention. But, in some cases, it may be necessary to bring the pressure of the load as low down as possible, and to equalize it beween the two sides of the carriage, so as to cause one to balance the other. This is particularly the case in the attempts which have been made to construct vehicles with one wheel only, in which there is nothing to maintain the erect position of the vehicle, but the attachment of the shafts to the horse's body, and preserving as correct an equilibrium as possible on either side of the wheel. My invention of cross levers is particularly applicable to this purpose."

He goes on to give an example of the manner in which this may be applied, even without the intervention of a

bearing-rod, see fig. 3, in which *a* is the body of a gig having but one wheel, as seen from behind; *b*, *b*, is the carriage or frame and shafts; *c*, *c*, the wheel brackets; *d*, *d*, the axle of the wheel, *e*; *f*, *f*, two springs firmly fixed at their lower extremities to the brackets. The upper ends of these springs carry anti-friction rollers, *g*, *g*, upon which the two levers, *h* and *i*, are supported, their fulcrums being at *k* and *l*, on elongated pivots. The opposite ends of these levers are attached to swivels *m*, and *n*, which fit into loops on the under side of the body.

The operation of these springs and levers will be understood by the description of the former apparatus. If a load be placed on the side of the gig, its force will be transferred to the bottom of the opposite spring, *f*, and consequently it will act on the contrary side to that on which it is placed; and being removed from a high to a low situation, produces the best effect which can be expected in a vehicle of this description.

In this specification, the particular forms of the parts are not claimed, but merely "the mode of hanging the body to the carriage, upon cross levers, either with or without a bearing-bar, and with or without a swivel-bar, or with its substitution of a cross-spring," as above described.

Inrolled, April, 1821.

To ROBERT STEIN, *of Walcot Place, Lambeth, in the County of Surrey, for certain improvements in Steam Engines.*

THESE improvements consist in a method of working the pistons of two cylinders, at the same time; one cylinder being placed above the other, and both pistons upon one

rod. Steam, at the low pressure, is employed in one cylinder, and heated air and steam at a high pressure in the other. The air for the high pressure is heated by being forced in blasts through a confined furnace, and thence conducted along a pipe to the high pressure cylinder; which pipe, passing through the water of the steam-boiler, assists in generating the steam employed for the low pressure.

The specification describes the first part of the invention as a method or apparatus, "to produce a continued supply of heated air, or elastic gas, combined with steam, which heated air or gas combined with steam, shall be capable of being employed to actuate machinery, constructed upon the same principle as the steam-engines in general use." For this purpose a furnace is to be provided of sufficient strength to sustain a great pressure, and lined internally with fire brick. This furnace is to be closed on all sides, excepting the aperture for introducing the blast, and for discharging the heated air and gas.

Plate XVIII. Fig 1. is a section of the whole apparatus taken lengthwise. The fuel is to be introduced into the furnace from the hopper, *a*, at proper intervals, by the revolution of the fluted roller, *b*, which may be moved by any convenient means. The object of this roller, which fits close as it revolves within the neck of the furnace, is to prevent the intrusion of air, or escape of the rarified vapours from the furnace. A similar apparatus is also applied below, for the purpose of discharging the cinders and dust. In lighting the furnace, the fire is to be introduced at a convenient opening, which must be afterwards closed air tight, in order to prevent the escape of the heated air

When the fire is lighted, a strong blast is thrown into the furnace, by any artificial means, through the pipe, *c*;

which air, becoming greatly heated and expanded in its passage through the fire, is conducted along the pipe, *d*, to the high pressure cylinder, *e*. A jet of water is occasionally let into the coal-hopper, which descends with the fuel to the fire, and produces a portion of steam which accompanies and adds to the expansive force of the rarified vapour in working the high pressure part of the engine.

The pipe *d*, which conveys the heated air, is passed through the water of the boiler, for the purpose of producing steam to work the low pressure engine: this steam is conveyed along the pipe, *g*, to the low pressure cylinder, *h*. The two cylinders are furnished with suitable valves, to distribute the steam in one, and the heated vapour in the other, in a similar manner to the induction valves and connecting rods of ordinary steam engines, for the purpose of producing the reciprocating motion of the pistons. The condensation pipe is shewn at *i*.

By this arrangement of the apparatus, the first portion of the heat contained in the gas that comes from the blast furnace, is employed in producing steam in the boiler for working the steam cylinder, which is connected to the condensation apparatus in the usual manner; the remaining portion of heat is intended to act on the high pressure or elastic air-cylinder attached to the same machinery, as above described, or otherwise, as circumstances may require.

The second part of these improvements is particularly applicable to a situation where saving of room is required, or a diminution of weight is desirable, as in steam-vessels or steam-carriages. In this case the steam-boiler in ordinary use is dispensed with, and the closed furnace, with its feeding apparatus, as above described, is employed alone. Into this furnace, a strong blast of air is to be conveyed as before expressed, and also a small supply of water,

for the purpose of generating steam. Thus, a vast quantity of elastic vapours may be employed to act in a cylinder in the same manner as in those engines denominated high pressure, where the vapour, after having performed its office, is permitted to escape into the open air as at *j*, which is the eduction pipe of the high pressure cylinder. A blast cylinder is, in this instance, proposed to be worked by the ascent and descent of a rod connected to the beam of the engine; the cylinder having two passages for the wind, is intended to eject a blast to the furnace, both by the ascent and descent of the piston.

The third improvement consists in a mode of regulating the temperature of the furnace, and of the quantity of vapour generated by means of a stop-cock, *k*, placed in the blast pipe, which has two passages leading into the furnace; one of these directs the blast into the body of the fire, the other to the upper part of the furnace. The plug of the stop-cock is so formed, that, by lowering its lever, a less portion of the blast will be directed through the fire, and a part of it conveyed into the furnace above, by which means the heat, or expansive force of the vapour emitted will be reduced. To the handle of the stop-cock a chain is connected, which passes over two pulleys, *l*, *l*, and suspends a loaded piston, *m*. This piston, it will be seen, works in a cylinder, communicating with the vapour pipe, *d*; and, in the event of the expansive force of the heated air being too great, it will press against the under side of the loaded piston, so as to raise it up; and hence, the chain will run back and permit the loaded lever of the stop-cock to descend, and partly close the passage of that part of the blast pipe, *c*, which leads to the under-side of the fire, as described above. But, on the contrary, if the temperature be not sufficiently raised, the weight of the loaded piston will lift the lever of the stop-cock, and open

the lower passage of the blast pipe, and close the upper one.

The working beam, and other parts of the engine are intended to be of the usual construction, and their description is, therefore, omitted in the specification. A contrivance is proposed for intercepting any dust or ashes which may escape with the heated air from the furnace; which contrivance will also assist in generating steam to act with the heated air in the high-pressure cylinder.

This apparatus is shewn at fig. 2, and consists of a closed vessel or reservoir, *n*, containing water; *d* is the pipe of heated air aforesaid, proceeding from the furnace, which is inserted into the cover of the vessel, and descends beneath the surface of the water; *o* is a part of the induction pipe communicating with the air-cylinder. The bottom of the reservoir, formed conically, is closed by a sliding plate, which, on being opened, as occasion may require, discharges the water and other matter that may have deposited itself within the vessel. The reservoir is supplied by the pipe, *p*, in which the water is kept at a regular height by the float or ball-cock. The operation of this apparatus is as follows: the heated air coming from the furnace will be conducted by the pipe, *d*, nearly to the bottom of the water, when it bubbles or rises up, and passes through small holes pierced in the plate, *q*, and escapes through the pipe, *o*, to the high pressure cylinder, accompanied by a considerable portion of steam, generated in the passage of the heated vapour. Thus, all the dust, ashes, or other matters are deposited in the bottom of the reservoir, and may be removed as above stated.

The patentee concludes his specification by saying, "I wish it to be understood that I do not claim the principle of the internal fire to be maintained by an artificial blast of air; but I limit my claims, first to the general combi-

nation of the apparatus for passing heated air through channels arranged in a close boiler containing water, for the purpose of raising steam therefrom to work a steam cylinder, and afterwards employ the same heated air combined with a portion of steam, which was formed in the furnace as already described, to act in a high pressure cylinder, in consort with the steam-cylinder. And secondly, the manner of regulating the temperature of a furnace, by admitting a portion of the blast above the fuel, at the same time diminishing the blast through the fire. All other parts or apparatus represented in the drawing or description being only introduced to shew the practical application of my improvements, and may be varied according to the discretion of the workman constructing the same."

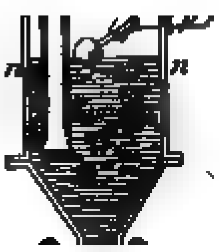
Inrolled, August, 1821.

To HENRY PENNECK, *of Penzance, in the County of Cornwall, for an invention of an improvement or improvements of Machinery, for the purpose of lessening the consumption of Fuel in working Steam-Engines.*

THE first part of these improvements applies to the condensation apparatus of double engines, and consists of a method of using two condensers; one of them communicating by tubes to the bottom of the cylinder and air pump, and the other to the top of the cylinder and air pump, furnished with the usual valves. An air pump having a solid piston is employed, which has two discharging valves, one at the top, the other at the bottom; by this contrivance, one condenser is exhausted by the ascent of the air pump piston, the other by its descent.

PLATE XVII.

Penneck's. Mechanical Agent.



These two condensers are to be kept separated from each other, and from the air-pump, in a cistern of cold water; and, in order that the water may be retained as cold as possible, two vessels are placed within the cistern, in which the condensers are to be immersed, their tops rising about an inch above the water's surface. Into these vessels the water for condensation is conveyed to be acted upon by the ordinary injecting apparatus. Thus arranged, the water does not become heated by standing in the vessel, where the condenser and air-pump are usually placed: by these means the condensation and vacuum of double engines will be rendered more perfect, and their effect improved. On some occasions where the weight of the atmosphere is insufficient, a forcing pump is employed to be worked by the beam of the engine, for the purpose of forcing the water into the condenser.

In the second part of the invention, reference is made to the patent of Robert Dunkin, of Penzance, granted in February, 1813, for "*methods of lessening the consumption of steam and fuel, in working steam-engines, and also methods for the improvement of certain instruments useful for mining or other purposes;*" which patent has subsequently become the property of the present inventor.

"Whereas the said Robert Dunkin did in, and by his said specification, (among other things) describe a certain machine for regulating the stroke of the engine as follows: When the stroke of the engine begins in greater power than it terminates (which may be done by shutting off the steam at half the stroke or otherwise) in other words, commonly called working expansive, &c. And after having described a machine to be applied to a single engine, he proceeds to describe one as applicable to a double engine in the following words:—When I wish to regulate each stroke, I apply different machines according to cir-

cumstances, I use a lever with a single crank with a pulley-wheel fixed to the axletree, attached by chains to the rods, which only goes through half a revolution and back again. Now, I have improved this machine in the manner shewn."

In Plate XVIII. fig. 3, *a* is the main rod of a steam-engine; *b* is a loose wheel or pulley, with two grooves round its periphery, which slides upon its axle; *c* is a chain attached to the wheel, and being passed round it in one of the grooves is brought up and connected to the rod, *a*, by a bolt; *d*, is a similar chain also attached to the wheel, *b*, and being passed round it, is brought down and connected to the lower part of the rod, *a*. As this rod is forced up and down by the alternating action of the engine, the wheel or pulley, *b*, is, by the chain, made to revolve backward and forward upon its axle, *e*; upon a square, on the same shaft, a lesser wheel, *f*, is fixed, having a notch in its periphery, for the purpose of receiving a catch, *g*, which turns upon a pin, fastened into the raised part of the periphey of the wheel, *b*. When this catch is in the notch, the two wheels, *b* and *f*, are connected together, and as the alternating motion of the main rod acts upon the pulley-wheel, *b*, by means of the chains, *c* and *d*, as before described, the wheel *f*, and its axle are made to revolve also.

At each end of this axle, *e*, a crank is fixed; these cranks stand in opposite directions, and to them, the sweep-rods, *h*, *h*, with sliding loops, are attached. Pins, *i*, placed near the ends of a double, or forked lever, *j*, (loaded at its reverse end) pass through the loops of the sweep-rods, and form that connection between the rods *h*, and the lever *j*, which causes the lever to be brought down by the cranks. Thus, by the descent of each crank, the rod connected to it, brings down the forked end of the

lever, as shewn by dots in fig. 3, the rod of the rising crank at the same time sliding up. The regulator of the catch is marked *k*; its fork rests on the axle, and its upper end is attached to a cross-beam by means of a nut and bolt. This bolt slides in a groove in the bearer, and also in a groove at the end of *k*. *l*, *l*, *l*, are rods for the purpose of lifting the catch, which rods lead into the engine-house, and are there connected to a handle.

When the engine first begins to work, the vacuum being imperfect, it is with much difficulty that the load in the pumps is raised; the lifter, *l*, is therefore to be drawn up, which raises the catch, and disengages the wheel, *f*, from the wheel, *b*; hence the engine is first put in motion without communicating motion to the axle; but, when the vacuum becomes more perfect, and the engine makes longer strokes, the lifter, *l*, is let down, and the catch, *g*, is forced by its spring into the notch in *f*.

By the ascent and descent of the rod, *a*, the alternating motion of the engine is now communicated to the axle, *e*; as the rod rises, the chain, *c*, is unwound from the pulley, and the chain, *d*, wound round the pulley; as the rod descends the reverse takes place, and by each motion, one of the cranks causes the loggerhead, or loaded end of the lever, *j*, to rise. "The motion of *a* continuing, the crank goes on, and the load on *j* subsides, thus winding up the chain, *d*, farther than the motion of the engine, and restoring the power which it took to raise it."

In illustrating the advantages of this contrivance, it is further said, "If the engine is acting expansive in the first part of the stroke, the steam is in excess of power, and capable of raising both the load in the pumps, and the load on the levers; but as the steam declines in power, the lever assists the engine. This will be clearly understood by the table constructed by the celebrated Mr. Watt, and de-

tailed in the Encyclopædia Britannica, and Rees's Encyclopædia, where he has shewn that the power of steam decreases in proportion to the capacity of the vessels in which it is expanded; and that, if the steam-valve be shut, when the piston has descended a quarter part down the cylinder and the remainder of the stroke performed by the expansion of that steam, the effect produced is more than half the effect that would have been produced by one whole cylinder, full of steam, if it had been admitted on the piston during the whole length of the descent. When, therefore, the engine is capable of performing its stroke, and this machine is connected by letting down the lever, *l*, the screw must be brought down until it works easy, and hence the saving of fuel, by stopping off the steam sooner, from the cylinder: no particular attention will be then necessary, for whether it makes a long or short stroke, the effect will be relative."

" I sometimes use the catch and apparatus for shutting off, with a single crank and common lever, with a chain instead of a sweep-rod, and a spring beam, and allow the crank to traverse more than 180 deg.; but some alteration will then be necessary."

In " Mr. Dunkin's specification above referred to, he has described a machine for the same purpose as the former. I convert this into a rotatory machine, by substracting the stops and the lever; it will then perform a continued circular motion, by the force of the engine exerted on the main rod; but I further improve this machine."

Fig. 4. *a*, is the main beam, in place of the forked lever above-mentioned, the end of which is connected to the piston-rod in the usual manner. One of the limbs of this beam is longer than the other, for the purpose of receiving the two rods, *b* and *c*. To these rods are connected

chains, which pass round pulleys, *d* and *e*, turning loosely upon the main shaft, *f*, *f*. As one of these rods is before the machinery, and the other behind, it is evident that the pulleys, *d* and *e*, by the up-and-down motion of the rods will, at all times, be turned round in opposite directions: *g*, and *h*, are two toothed-wheels, fixed upon square parts of the main shaft, *f*. On the side of the pulley, *d*, there is a pall or catch, falling into the teeth of the wheel, *g*; a similar pall is also on the side of the pulley, *e*, falling into the teeth of the wheel, *h*. Thus, as the rods, *b* and *c*, descend, the pall, *j*, of the pulley, *d*, catching in the teeth of the wheel, *g*, carries it round, and the main shaft with it; the pulley, *e*, at the same time sliding upon the main shaft, and its pall passing over the teeth of the wheel, *h*, without affecting it. By the ascent of the rods, *b* and *c*, the pall, *j*, of the pulley, *e*, catches into the teeth of the wheel, *h*, and drives it and the main shaft round, the pall of *d*, now sliding over the teeth of *g*, without affecting it. Hence the up-and-down motion of the beam and rods being communicated alternately to the wheels, *g* and *h*, the shaft, *f*, is carried round with a continuous rotatory motion, which, by means of a cog-wheel, *i*, is made to turn other machinery.

In the event of motion being required, in the reverse direction to that above described, there is a method proposed of changing the operation of the palls upon the toothed wheels, previous to which the machinery must be stopped by means of a lever, *o*, which forces a catch into the teeth of the wheel, *i*, and stops the machinery. The form of the palls are shewn at *j*, fig. 5; and the mode by which they are turned over, so as to act in the teeth, in the reverse direction, will be understood by the following description:

Wheels, *k*, *k*, fig. 4. turn round upon hollow cylinders, fixed in the frames, and shewn by dots; within which

wheels there are recesses containing bolts, that are to be projected forward, so as to strike against the palls and turn them over. This is done by turning the winch, *l*, which, by means of the pinions, *m*, *m*, will cause the wheels, *k*, to move round: about a quarter of a circle is sufficient. In this movement of the wheels, *k*, the bolts within are carried against inclined planes upon the sides of the stands or frame, which projects them out sideways, sufficiently far to meet the ends of the palls; by which means the palls are turned over, and their reverse ends forced into the teeth of the wheels. Thus a contrary revolution of the main shaft is produced; observing that the winch must be turned back immediately after this is effected, in order that the bolts may be allowed to spring back into their recesses, and stand free of the palls as the machine goes round.

"My next improvement applies to the kibbles of a steam whim, or other machine of that kind. It consists in fixing a similar rope, to that to which the kibble is hauled up to the ring at its bottom, and extending it down the shaft, and attaching it to the bottom of the other kibble; but so long as not to affect the lower kibble, by the action of landing the stuff out of the upper one. The two kibbles having the rope which connects their handles, passed with sufficient rounds to give steadiness on the barrels, which may be fixed on the shaft of the rotatory machine, last mentioned, will be balanced; and if a strong hook is suspended, by a rope, at the mouth of the shaft, and a ring is placed on the rope, at the bottom of each kibble, but at a sufficient distance to admit the kibble to be drawn up to the whim-sheave, which carries the rope to the rotatory engine; and, when the kibble is drawn to that height, the hook, at the shaft's mouth, is fixed in the ring before mentioned. The motion of the rotatory being reversed, the kibbles will descend, and suffi-

cient slack rope will be given to admit of its being again unloaded, without difficulty; when the motion of the machine should be again reversed, and the kibble again brought up to the whim-sheaves, so as to tighten the rope, the hook may then be removed, the motion of the machine again reversed, and the kibble lowered away, and the one rope and kibble will so completely balance the other kibble and rope, that, except from the shaft up the whim sheavé, the engine will only have to lift the contents of the kibble then below it; besides, the kibbles will be kept steady, and not liable to be dashed about."

"In order that the miners may be able to draw their stuff from lifts of different depths, the ropes may be made divisible, by means of shackles, placed at such distances, similar to the method by which Mr. Acraman shortens his patent cables; and at the different lifts, hooks should be placed, suspended as before-mentioned, at the mouth of the shaft, and rings on the ropes, at proper distances, for hooks to hold by; and by such means little difficulty will be experienced in the use of this method."

Inrolled, August, 1821.

The obscure manner in which this specification is drawn up, renders it extremely difficult to be understood, which must be our apology for the description here given. We quote the original more extensively than is our usual practice; for not being able, in some instances, to determine the precise meaning of the inventor, we have no other alternative. The great length to which this article has, of necessity been extended, precludes our further comment; but we refer our readers to the specification of William Aldersey, Esq. (page 267 of the present vol.) which describes nearly the same mode of converting an alternating into a rotatory motion, as described above.

To MATTHEW BUSH, *of Battersea Fields, Surrey; for an improvement on a Machine now in use, for printing Silks, Linens, Woollens, and other similar Fabrics; by means of which improvements, Shawls and Handkerchiefs, can be printed with one or more colour or colours; and whereby Linens, Calicoes, Silks, Woollens, and other Fabrics of the like nature, intended for garments, can be printed with two or more colours.*

THIS invention is an improvement upon a former printing apparatus, for which the said Matthew Bush obtained a Patent, dated January, 1813. In that patent, the improvement upon the ordinary press, with copper-plates, employed for printing silks, linens, calicoes, and woollens, consisted in the introduction of one or more "revolving pieces, which carry *circular* faced blocks, for printing." Now, the present improvement is the substitution of *flat* faced blocks, on which the subject in relief is to be cut, for the purpose of printing two or more colours, and also for the employment of copper-plates in a different manner to that hitherto practised.

The patentee states, that this invention is applicable to common copper-plate printing presses, now in use for the printing of silks, linens, calicoes, woollens, &c. and that by means of this improvement, shawls and handkerchiefs, with borders, can be printed in the same machines, with great rapidity, by taking successive impressions from two narrow copper plates, which are to be attached to the moving carriage or rail of the press, in an improved manner. One of these plates is to be engraved with the figure of the cross-border of the shawl or handkerchief, and the other with the pattern of the interior, having at its ends the correspondent portions of the border, by the last of which plates, all the middle of the shawl or hand-

kerchief, and its sides or edge is printed at several suc cessive impressions.

The same shawls or handkerchiefs may, if required, immediately after the above process, be printed or grounded with a second colour, by the flat blocks above mentioned, cut in relief, which are to be worked by the same press; one of the blocks being adapted to print the filling up of the ground and side borders, and the other the cross, or end borders.

The first part of the invention consists in the manner of applying the two copper-plates. That plate which is to give the pattern of the interior part of the shawl or handkerchief, is proposed to be in breadth one-fifth of the size of the handkerchief, within the border, and as long as the handkerchief is wide, including the border; the corresponding fifth parts of which are to be engraved at its ends. This plate is intended to produce the complete in ternal pattern, at five successive impressions; and the second plate, which contains the border only, is intended by sliding the carriage forward, to occupy the place of the last, and complete the impression or pattern, by giving the border. The border plate is made to turn round horizontally upon a pivot, so as to give the border in the reverse direction for the commencement of the next handkerchief; after which, the carriage is slidden back again, and five successive impressions taken from the first plate, as before described, for the internal pattern of the handkerchief. In order to regulate the junction of the different impressions, certain stops are provided to arrest the progress of the web and piece. The inking and cleaning of the plates are performed as usual, and the whole turned by a winch and a train of cog-wheels, which mechanism is not claimed as new.

The second part of the improvement consists in the manner of applying the flat block to print or ground another colour. This block is suspended by levers, and is brought in contact with the piece of goods intended to be further printed, immediately after the main roller has delivered the piece from the copper-plate. A colouring roller is made to pass against the engraved surface of the block, when in its quiescent state; and, as the piece approaches to be printed, the levers raise the block, and at the same time a circular press acts against the back of the block, so as to bring it in contact with the piece of goods, and causes the impression to be given. The nature and operation of the several parts of the machinery necessary for the performance of the above process, will be easily understood by any mechanic.

In the event of a third colour being required in the pattern, it is proposed to be produced by means of another flat-faced block, which is to be suspended by a lever over the machine, and brought down by hand, so as to give the impression; the rollers and the piece of goods being at that time stationary. Certain stops and regulators will, of course, be necessary, in order that the different impressions should all register with accuracy. By these improved means, the printing of garments or gown-pieces, in several colours, may be effected; in which the copper-plate, as usual, is designed to give one of the colours, and one, two, or three other colours may be produced by the flat blocks cut in relief, as above described.

Inrolled, January, 1821.

To SAMUEL KENRICK, *of West Bromwich, Staffordshire, for an improved method of Tinning Cast Iron Vessels of capacity.*

THIS invention, of a new method of Tinning Cast Iron Vessels, consists in a mode of suddenly cooling, and setting tin, and other fusible metals, mixed with tin, upon the surface of cast iron; which is effected by the application of a rapid current of cold air, to the coating of tin, whilst in the state of fusion.

The method of tinning hitherto practised, has been, first to render the surface of the vessel smooth, by grinding, or otherwise polishing, and then, having sufficiently heated the vessel, to pour a quantity of melted tin into it. Sal-ammoniac is then melted and rubbed upon the smooth surface of the vessel, and by means of a cork, held by a pair of tongs, some of the moulten tin is thrown upon the surface, to which it adheres. The vessel is then plunged into water, for the purpose of cooling and setting the tin. This mode, however, cannot be successfully employed upon both surfaces at once, and the improved method is therefore proposed, as capable of effecting the object of tinning in a more perfect manner.

The vessel, or surface of cast iron, is to be rendered smooth, and the same method resorted to of using the moulten, or fluid metal with sal-ammoniac, as above described. But in the operation of cooling, or setting the tin, instead of immersion in cold water, a powerful blast of cold air is to be thrown upon the surface of the vessel, by which the tin becomes instantly set upon the iron surface.

Bellows, or a blowing machine, may be employed for this purpose, and the air admitted suddenly, by means of a stop-cock, into a vessel con[illegible] article to be tin-

ned. Any method, however, of conveying the cold blast on the surface of the iron coated with tin, while in fusion, may be resorted to, as the inventor claims the application of cold air, in every mode by which it can be used for this purpose; and observes, in conclusion,—" I wish it to be understood, that I do not make claim to any method of applying the tin upon the surface of the cast iron vessel; but I confine my claim to the employment of a rapid current of air applied artificially, for the purpose of suddenly cooling and setting the tin upon cast-iron vessels, to complete the operation of tinning the same."

Inrolled, November, 1820.

To Lieutenant Colonel HENRY GOLDFINCH, *of Hythe, Kent, for his improvement in the formation of Horse-shoes.*

THIS improvement consists in making the horse-shoe in two parts, or separating it into two pieces, by cutting it through near the toe. The object of this contrivance is, that the frogs of the horses hoof may be enabled to expand, and grow in a healthy state; (see Coleman's patent, vol. 1. of this journal, page 344.) The separation is to be made in any indented form, and the two parts fastened together by pins. It is further proposed to attach the shoe to the horse's hoof, by driving the nails obliquely, as in the French manner of shoeing. For this purpose the situation of the nail holes are to be from about one third, to half the width of the shoe, distant from its outer edge, and tending in a slanting direction outwards. See plate XX. figure 5.

Inrolled, October, 1821.

To Samuel Hall, *of Basford, Nottinghamshire, for improvements in the manufacture of Starch.*

The improvement here proposed applies to the removal of all colouring matter from the starch, which is effected by the employment of oxygenated muriatic acid, and diluted sulphuric acid. This may be performed by submitting the starch to the action of the oxymuriatic acid, in its gaseous state, or in any other combination, which is proper for bleaching purposes; the oxymuriate of lime, however, is preferred as being both convenient and economical, and is used in the following manner.

After the starch has been prepared by the usual processes, and has arrived at the state in which it is ready for boxing, instead of proceeding to box the starch, it is to be stirred up with as much water as will make it about the consistency of cream. To this is now added the oxygenated muriate of lime, and the whole continually agitated, whilst the acid is operating upon the starch to whiten it.

A large quantity of water is then to be added, and after well stirring the mixture, it is left till the starch subsides to the bottom. The water must be then drawn off, and diluted sulphuric acid poured into the starch, which is to be again agitated until the acid has acted fully upon it. A considerable quantity of water must be now employed to wash away the oxymuriatic and sulphuric acids, after which the starch is left to subside, and the water drawn off as before. The washing may be repeated with clean water, as often as may be thought necessary to remove all smell from the starch, which is then to be boxed, dried, and finished in the usual manner.

The patentee observes "The quantity of muriate of

lime, and of sulphuric acid, which is required to whiten the starch according to my improvement, will be easily ascertained by a few trials: no rule can be given for the quantities, because it depends upon the quantity of the starch, and the strength of the acid: but no greater quantity should be used than is absolutely necessary to produce the desired effect."

"The starch may be whitened with oxymuriate and sulphuric acids in the way above described, as soon as the slimes are separated from the starch, instead of waiting to complete it ready for boxing. The starch-maker will find by a few trials at what stage of his usual process my improvement may be performed with most convenience."

Query: could not a given quantity of the starch and of the acid to be employed at a certain strength, have been stated? This sort of ambiguity is at all times dangerous to a patentee, as the laws relative to patents expressly state, that a competent workman in the particular branch of manufacture to which the invention or discovery relates, shall be able to perform from the specification alone, *without experiments.*

Inrolled, November, 1821.

To WILLIAM LANE, *of Birmingham, for an Invention of certain Improvements on Horizontal Roasting-jacks, which Improvements are applicable to other useful purposes.*

THESE improvements consist in uniting the power of several springs together, by means of which, their forces are applied collectively to produce the movement.

Spring-barrels or cylinders are employed, each containing a spring of steel coiled round an axle, to which it is attached at one end and to the cylinder at the other; the nature of which spring-barrels are well known as commonly applied to spring jacks and to clock movements. Two, three, or more of these spring-barrels are connected by means of cog-wheels upon their periphery, which, by taking into each other, combine the effect of the several springs, the object of which is to gain an accumulated power.

The power of these springs combined as above, are exerted upon the mechanism by means of a chain coiling round the barrel which is drawn off by the fusee; and the various toothed wheels connected thereto, communicate the movement to the main axle, which, regulated by a flyer, as usual, produces the revolution of the spit. The jack is intended to be enclosed within a box, and mounted upon a stand to be placed at the side of the kitchen fire, which can be removed when out of use. The stand may consist of two upright rods rising from a base; upon these rods the jack-box is intended to slide for the purpose of being raised or depressed, to regulate the height at which the spit is to be placed before the fire.

The patentee observes, "I rest my invention merely in the combining of several spring-barrels together by means of geer, so as to employ the united power or effect of several springs together to produce the rotatory motion. I wish it likewise to be understood, that though I have described my invention as applicable to the construction of horizontal jacks, yet I do hereby claim the adaption of the same invention: (viz.) the combination of several spring-barrels to the purpose of producing

rotatory motion in various other machines or pieces of mechanism to which such invention is applicable."

Inrolled, October, 1821.

To William Henry Higman, *of Bath, for certain Improvements in the Construction of Harness, which he conceives will afford great relief to Horses in drawing Carriages of various descriptions, and be of public utility.*

These improvements are a new mode of fastening the tugs or traces of gigs and other carriages to the hames or irons of a horse's collar. The fastening is effected by means of a button or knob attached to the hames, and a staple or loop-plate attached to the trace or tug. Plate XIX. fig. 4, represents a hame of the usual form, with the button or improved fastener; *a*, may be called the butt or solid part, welded to the hame; *b*, the neck of the button upon which the staple or loop plate is to work, and of such length as the thickness of the loop-plate and leather; *c*, is the head of the button for the purpose of preventing the loop from coming off. Fig. 5, is the outer side of the staple or loop-plate; and fig. 6, the reverse side of the same; the slit or oval hole being for the purpose of admitting the oval head of the button, which, when passed through, is prevented from slipping out again by turning the loop-plate round, so as to bring the length of the oval head across the narrow part of the loop-plate.

As it is necessary to confine the action of the button in the loop plate, a key piece is introduced as fig. 7, which being slidden into the hole of the plate on the side shewn at fig. 6, is there flattened by screws, and fills up the slit, excepting a round space intended to receive the neck of

the button *b*, fig. 4. It is to be observed that the button should stand forward obliquely upon the hame: that is, forming an angle of 20° or 25° degrees from the back or flat surface.

The substance or strength of the button and of the loop plate must depend upon the particular description of harness to which it is intended to be affixed. After the staple plate is attached to the traces, a piece of steel or whalebone of about 5 or 6 inches, is to be placed between the plate and outer leather for the purpose of giving it elasticity.

Inrolled, October, 1821.

In comparing our report of *Recent Patents* with the list of *Patents Sealed in* 1820, it may be remarked that several remain unnoticed. Upon this circumstance we beg to observe, that the specification of every patent inrolled during that year, has been faithfully described by us either in the present or preceding Volume: the apparent omissions are attributable solely to the respective, patentees, who, in seven instances, have neglected to specify their inventions. Whether this may have arisen from a design to conceal the invention; from accident or any other cause we know not; but as the provisional clause in the grant of letters patent, directing the inventor to specify within a certain time, has not, in these instances, been complied with, these several patent rights have "determined and become void."

In compliance with our promise, the London Journal of Arts and Sciences, will continue to give an early report of every new patent invention, and to describe the

principles and properties belonging to each, with such critical remarks as may appear necessary or useful to the practical or theoretic mechanic.

Original Communications.

To the Editor of the London Journal of Arts, &c.

SIR,

As every thing relative to *Africa*, has become at the present time more than ordinarily interesting, I send you the following extract of a letter which I received a few days ago from an intelligent young man, who has been for two years past engaged in commercial speculations on various parts of the African Coast and in the Gulph of Guinea. The letter is dated from Animaboo, twelve miles from Cape Coast. I am yours, &c.

London, November 19th. 1821. J. J.

We are all here on the tiptoe of expectation as to the new form of Government to be established; but we can learn nothing decisive from England, although papers have been received to the 11th of May. I am very much afraid that the government of Cape Coast will be made subordinate to that of Sierra Leone. If such be the case it will at once blast all the improvements making here under the present Governor, and put a stop to the proposed buildings and other improvements of private gentlemen. Besides, the present Governor is so much liked by the officers and natives, that his example has a wonderful influence over all persons; and his being much attached to the improvement of the town and neighbourhood, makes every other person almost equally so: the

different appearance of Cape Coast, even since I have been in the country, is astonishing.

The superior quality of the land on this part of the coast, compared with Sierra Leone, is also another advantage.

Sierra Leone is built on a rock, apparently of volcanic origin; the heavy rains and thick fogs that visit it for six months in the year, and obscure the face of nature, render it one of the most unhealthy places on the whole coast of Africa. Labour, too, is so exceedingly high at Sierra Leone, as to be an insuparable bar to cultivation to any extent, even allowing the land to be suitable for the purpose; whereas here (Cape Coast and its neighbourhood) coffee and cotton shrubs flourish almost spontaneously, and the sugar cane is indigenous. I have no doubt that a plantation of coffee, cotton and sugar would be found more profitable here, than one conducted on a similar scale in the West Indies. The land is excellent, labour cheap, the climate compared with the West Indies, healthy, and the natives free. The consumption on the coast and at the islands would also be considerable; and an immediate sale for the rum from the distilleries on the spot, would double the price it fetches in the West Indies or even in England. Tobacco might also be grown here with great success, and a large quantity sold, as the demand for it is astonishingly great.

For the Journal of Arts.

New Shetland.

No official accounts of the discovery of this Antarctic country has yet been made public; and it is said, that no official account is meant to be promulgated from that high branch of government to which such matters more im-

mediately belong. This report is, however, we trust inaccurate. We mentioned this discovery in our first volume, page 283, and also in our ninth number, page 200. Since the second voyage of the William, a Journal of which voyage has been lately published in the Literary Gazette, it appears that two Russian frigates on a voyage of discovery, circumnavigated the *New Shetland Islands* (for islands it is said this supposed antarctic land is,) and the *Sandwich Land* of Captain Cook proved also to be an island. From the whole of these discoveries it results as far as is hitherto known, that a very lucrative trade in seals may be carried on, as the sea swarms with these animals, which are of great sise, full of oil, and have the finest fur.

In other respects animal existence is limited in variety, though not in the number of particular species. The shores are covered with penguins, which even dispute possession with the human visitors. There are gulls, albastrosses, and one land bird about the size of a pidgeon. The sea-elephant also inhabits these dreary parts; whales are also numerous but extremely poor; no fish were caught or seen; and the only conchological products on the shores were the empty shells of limpets.

One of these islands has been named Penguin Island, the latitude of anchorage was ascertained to be 62° 6″ S. at the S. E. end of the island. The longitude where the jack was planted, 58° 7″ W.; latitude 62° 4″ S.; variation of the needle, 23° 59″ E. In George's bay, so named in honour of his Majesty, on account of its being the first part in which the British flag was hoisted, the tides rise pretty regularly from 14 to 16 feet, and appear to be entirely influenced by the winds. The coast at the bottom of the bay, consists of high snow cliffs. Notwithstanding the sterility of the land, there is a light soil at the back of

the watering place, a mixture of sand and mould, by digging into which not more than a foot in depth, water was found. The swampy land was covered with a sort of grass and moss, both of which abound in great quantities, and are all that deserves to be called vegetation. No land animal, except birds, was seen. Snow of a reddish tint was seen here as in the arctic regions: the cause of this colour the observers could not account for; it could not be occasioned by the soil, since under the chief place where the snow was found, there ran a very rapid stream of considerable depth, and the voyagers were then passing over valleys filled with snow. The stones and rocks consisted principally of white and brown granite and lime-stone, together with some varieties, of which specimens were preserved.

To the Editor of the London Journal of Arts, &c.

SIR,

HAVING thought of a contrivance to be employed instead of the ordinary safety-valve of a steam-engine, I beg leave to communicate the same to you; and which, from the experiments made upon a small scale, I am persuaded will answer perfectly, and do away some of the objections that are urged against the present safety-valves. A description of this invention with the accompanying drawing will enable you to understand its principles and action.

Plate XX. fig. 3, *a* represents the upper part of a boiler to which is attached a cylinder or tube, *b*; in this cylinder a solid piston, *c*, works, the rod of which is encompassed by a spiral spring, *d*. Upon the strength of this spring depends the power of resistance which the

piston-valve exerts against the pressure of the steam; *e*, is a grating carried round the cylinder, through which grating the steam is intended to escape into the exit pipe, *f*, opening outwards to the atmosphere; *g*, is a recess round the inside of the cylinder to receive the oil that may escape past the sides of the piston; and upon the edge of this recess the piston rests when down, as it will be while the engine is working; but, on stopping the engine, or the steam increasing in strength beyond the power of the spiral spring, the piston will rise till it reaches the grating, and then the steam will be enabled to make its escape. When the engine is again put in action, or the pressure of the steam decreased, the piston will descend by the power of the spring into its former situation and close the valve.

By inserting this invention in the London Journal of Arts and Sciences, you will much ablige.

Husbands Bosworth, Yours, &c.
Leicestershire. J. S. SHENTON.

To the Editor of the London Journal of Arts, &c.

SIR,

OBSERVING in your Journal of Arts, No. X. page 255, a report of my patent for *improvements on piano-fortes*, I beg permission to add the following remarks as applicable to, and in further elucidation of, that invention.

At the suggestion of certain eminent musicians, a celebrated mathematician was induced some years since to direct his attention to the enriching of the tone of piano-

fortes by the aid of harmonics;* but his designs were never carried into effect, from the great expense which would have attended their execution. I have, however, the satisfaction to say that by the present invention, that desirable improvement is obtained at the addition of a comparatively trifling cost.

By the "*Bridge of Reverberation*," the strings have the effect of being fixed like those of a harp to the sound-board itself, instead of being checked by an immediate attachment to a solid substance. This contrivance not only produces a more equal and rich flow of vibration, but takes away the whistling of the large steel strings, so common and often so disagreeable in grand piano-fortes on the usual construction. It also gives them great advantage of turning all those portions of the strings beyond the original bridge, which were before useless, to the augmentation and perfection of the tone produced on the main body of the instrument by means of the "*Harmonic Swell.*"

In expressive movements, and *legato* passages, the addition of the harmonics, independent of the beauty of sound, produces an advantage which must be obvious to every one, since it effects that continuity of vibration, which, somewhat like the bow of a violin, makes one note glide into another; and as this effect is produced without at all interfering with the dampers, the bass may be played *staccato*, whilst the treble is played *legato*, and vice versa. The whole volume of tone called forth by the harmonic swell and damper pedal combined, is

* Earl Stanhope we presume; if so, Mr. C. is mistaken, for his design was carried into effect, and a grand piano-forte upon his Lordship's plan is now in the possession of his Lordship's legatee.

of extraordinary richness and power; and in passages requiring bold contrast, dramatic energy, or sustained grandeur, will be found of singular efficacy.

The great improvement given by this new construction also to the *extra additional keys in the treble*, must be considered very important, since all the great Continental composers and performers now employ them so very frequently in passages of very brilliant effect; and since they are found so highly useful not only for duets by two persons on the same instrument, but for giving the master an opportunity of marking the character of passages above, whilst the scholar is practising them in the octave below.

The additional pedal for fixing the keys on two strings will be found very convenient, as it leaves the feet to be employed on the harmonic swell and damper pedal during a delicate strain, or for the purpose of accompaniment.

The simple principle on which the impróved grand piano-forte cases are constructed, is of such efficacy as to resist an immensely greater force than the most extensive compass of string can possibly produce. The advantage of this in keeping the instrument in tune, and counteracting the *effects of climate*, are sufficiently obvious.

Cheapside. W. F. Collard.

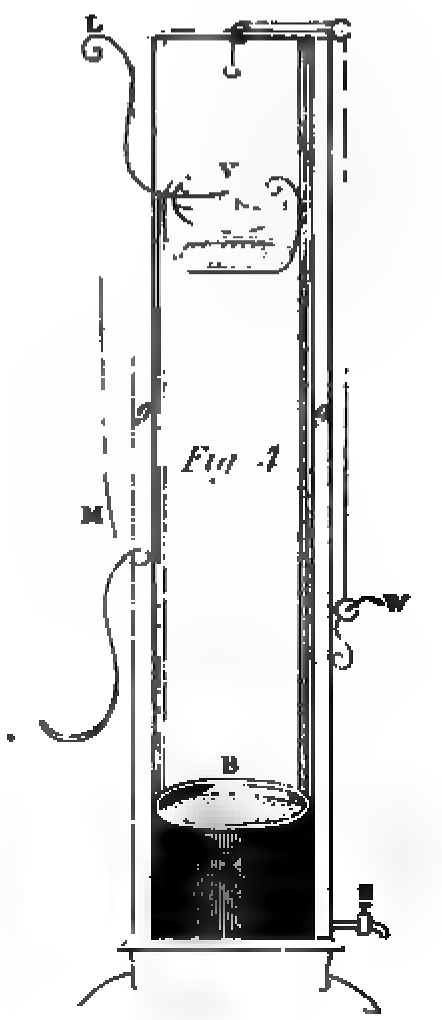
To the Editor of the London Journal of Arts, &c.

Sir,

Observing in the public prints that the provisions of Mr. M. A. Taylor's act were about to be put in force to compel the proprietors of Steam-Engines to erect such furnaces as should burn their own smoke, I am induced to send the following brief account of an apparatus for this purpose made by Mr. Johnston, Brewer, of Man-

PLATE XX.

Furnace for the Consumption of Smoke



Murrays, Shower Bath.

Scale of 1 2 3 4 5 6 7 8 9 10 Feet

Shentons, Safety Valve

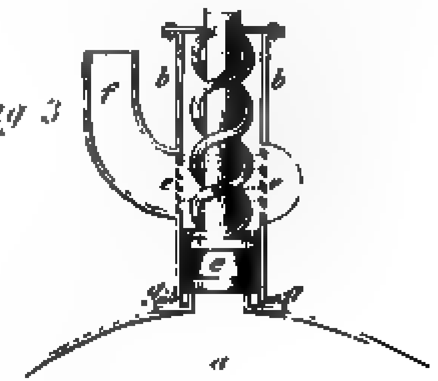


Fig 3

Goldfinches Horse-shoe

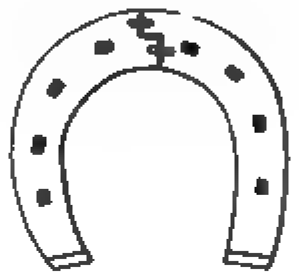


Fig 5

chester, which I have used for more than 12 months with perfect success, and for which he took out a Patent, I believe, in 1818.

The accompanying sketch will show that the pure atmospheric air is applied in a current to the smoke just as it rises from the coals, by which mode of application it mixes itself more effectually with the smoke than when suffered to enter merely by a perpendicular channel in the bridge; this intention of mixing the air and smoke is further assisted by a stop wall, which is also useful in keeping up the temperature of the smoke thereby partially detained under the boiler.

The mode of firing and the management of the air or throttle-valve are quite easy; and the apparatus answers equally well either with the strongest or the slackest fires, which may be suddenly increased or diminished at pleasure.

Plate XX. Fig 1, is a section taken length-wise of the furnace and boiler; Fig 2, a cross section of the same; *a*, is the boiler of a waggon form, to be furnished with proper safety-valves as usual; *b*, is the furnace extending to about one third the length of the boiler; *c*, is the ash-pit below; *d*, *d*, *d*, is the flue passing under and round the boiler; *e*, an iron door for occasionally cleaning the flue, but which is intended to be kept closed and as nearly air-tight as convenient while the fire is burning in the furnace; *f*, is a stop wall for the purpose of detaining the heated vapour; *g*, is the bridge formed of fire brick; *h*, is an after bridge, between which and the former a channel is made for the passage of a current of atmospheric air, which is admitted from the ash-pit below and conducted to the hinder part of the fire; by means of this current of air, the smoke is driven back into the fire, and thereby entirely consumed, leaving only a gaseous vapour, which passes on

through the flues round the boiler and into the chimney without any particles of soot accompanying it; *i* is a throttle-valve at the entrance of the air-channel; this is opened or closed by means of a rod, *k*, and hence regulates the current of air admitted through the channel to the furnace.

Some difficulty was experienced at first through the great wear upon the upper part of the after-bridge, but by getting it made in two pieces of fire brick, it now stands very well.

I am desirous to observe that I have no acquaintance with the patentee, but am solely induced to offer this slight communication, in the hope that it may prove serviceable to some of your readers, who may not have met with this apparatus for burning smoke before.

I am, Sir, yours &c. A. A.

Southwark, Nov. 1.

We have seen this apparatus in action and are fully convinced of its efficacy. When the furnace door is open while charging with fuel, the smoke passes through the flues and chimney in a dense column as from ordinary furnaces; but upon closing the furnace door the smoke instantly ceases, and is so completely consumed, that no particle whatever passes through the flues, the whole being converted into vapour.

Novel Inventions.

On the Smelting of Tin Ores in Cornwall and Devonshire, by John Taylor, *Esq.**

Tin ores are found in veins accompanied by various other minerals; and in alluvial matter in detached frag-

* Abridged from the Transactions of the Geological Society, Vol. 5, just published.

process of washing These are mostly decomposable by a red heat which the oxide of tin will bear without alteration. After the ores have been made as clean as possibleon the dressing floors, they are removed to the *burning-house*, having small reverberatory furnaces, on the floors of which the ores are spread, and submitted to the action of a moderate and regular fire; they are frequently turned over by an iron rake, to expose fresh surfaces to the air: A considerable volatilization of sulphur and arsenic takes place; the former is dissipated; the latter condensed in long horizontal flues constructed for the purpose.

After the ores come from the burning-house, the process of dressing is completed by further washing. Copper ore is not unfrequently present in these cases; and as it is in part converted into sulphate of copper, the water which is first used is preserved, and a portion of copper obtained from it by means of iron.

The great specific gravity of tin, renders it possible with care to subject it to many operations in dressing without much waste: these are therefore applied till the whole is generally so clean as to yield a produce of metal equal to, from 50 to 75 per cent. In this state they are sold by the miner to the smelter, who determines their value by assaying a fair sample.

The furnaces for smelting mine tin ore, are all of the common reverberatory kind, and are of a sufficient size to hold twelve or sixteen hundred weight of ore. The charge is prepared by mixing it with a proportion of stone-coal, or Welsh culm, to which is added a moderate quantity of slaked lime. These are turned over together, and moistened with water. It is necessary to employ a heat so strong as to bring the whole into perfect fusion; which is continued for seven or eight hours, when the charge is ready to be drawn. The furnace is furnished with a tap-

hole at the bottom, which, during the process, is stopped with clay or mortar; under the hole is placed an iron kettle to receive the metal. There is a door at the end opposite the fire-place, through which the scoria may be raked out from the furnace, while the tin is flowing out at the tap-hole.

The tin is laded into moulds, forming plates of a moderate size, and put by for further refining. The scoria, which rapidly hardens into a mass, is removed to a dressing floor, where it is broken up, stamped, afterwards washed, and a portion of tin taken from it, called *prillion*, which is afterwards smelted again.

In smelting tin ores there are but two things to accomplish: to obtain perfect fusion of the earths, so that the metal may readily separate from them; and to decompose the oxide of which the ore uniformly consists.

The method of *refining* the tin thus obtained, depends upon the facility or difficulty of oxidation of the bodies with which it is still mixed, their tendency to volatilize, the temperature required for fusion, or their relative specific gravities.

The substances most to be suspected in the produce of the first melting, which it is desirable to separate, will probably be iron, copper, arsenic, tungsten, undecomposed oxides, sulphurets or arseniats, and earthy matter or slag.

In refining, only a very moderate degree of heat is employed. The plates of tin are melted very gradually, and the metal runs from the furnace at once into the kettle, which is now kept hot by a small fire placed beneath it. The more infusible substances will thus be left in the furnace. A further purification of the tin is made by agitating it in the kettle for some time, by an operation called *tossing*, which consists in taking up a portion of

the melted metal in a ladle, and pouring it back into the metal from such a height as to stir up the whole mass, and put every part in motion. This being discontinued, the impurities on the surface are carefully skimmed off.

In general, after this, the metal is at once laded into the moulds; but some impure products may yet require further attention: such as that of keeping the mass in the kettle in a melted state, by which the parts which are heavier than the tin will sink to the bottom, and thus the tin becomes materially improved.

The last operation is that of pouring the metal into moulds, usually formed of granite, and of such a size as to make it into pieces of somewhat more than three hundred weight: these are called *blocks*, and are sent, according to the Stannary laws, to be coined by the Duchy officers. This comes to market under the name of *block-tin;* a certain part, which has been treated with more than common care, is called *refined tin.*

Grain-tin, from the ores of stream works, is obtained in a manner altogether different; except that the processes for separating the ores, by washing them from sand and gravel, &c. are very similar to those in daily use for dressing other ores, The stream tin is generally made very clean, and sold for smelting, to establishments called *blowing-houses.*

The reduction of the ores for grain tin is performed by blast-furnaces, and the only fuel used is charcoal. These furnaces are similar to those for smelting iron where the blast is used. They are formed by a cylinder of iron standing upon one end, and lined with clay or loam. The upper end is open for receiving the fuel and the ore, which are thrown in alternately: a hole at some distance from the bottom, at the back of the cylinder, is provided to admit the blast; and another lower down, and opposite

is considerably increased. Tin, though volatile to a certain degree, is unaffected by the process in any important manner; but as some flies off in white fumes, it is usual to construct a long horizontal flue, which is made to communicate with, and pass through, a kind of chamber, in which a considerable part of these fumes is condensed and collected.

A Notice of the Electro Magnetic Experiments of Messrs. AMPERE *and* ARAGO, *read in the Public Sittings of the Royal Academy of Sciences at Paris, April 2nd,* 1821.

NATURAL and artificial magnets, iron, nickel and cobalt were the only bodies in which the property of acting on the magnetic needle had been recognised; when M. Oersted, at Copenhagen, discovered that under certain circumstances, all metals without exception, and in general all bodies capable of conducting electricity, exercise very intense influence on this needle. To effect this, it is merely requisite to bring them into communication with the two extremities of the voltaic pile, making them serve as conductors to the current of electricity which it produces.

Last September, while engaged in experiments relative to this important discovery, the reporters met with another fact, more general and no less unexpected; viz. That two metallic wires, of whatever nature they may be, act upon each other when they both transmit an electrical current; and, what adds to the singularity of this result is, that the action is attractive when the currents are in the same direction, and repulsive when they move contrary direction.

At the same time M. Arago announced to the academy, that the voltaic current which, according to the experiments of M. Oersted, gives to all metals the property of acting upon magnets, is itself a powerful means of producing magnetism; by placing the conducting wire, in a suitable manner, round a bar of steel, even at a considerable distance you may produce in the bar as many poles as you please, and at the places chosen before hand. The same gentleman demonstrated soon after, that these effects are equally produced when common electricity is employed instead of that of the voltaic pile.

The directing influence of the terrestrial globe upon magnets is not merely one of the most remarkable facts of natural philosophy; we know also to what a height it has enabled us to carry the art of navigation. I flatter myself (says Mr. Ampère), you will be glad to hear that I have succeeded merely by a combination of electric conductors, to produce an apparatus in which there are only brass wires, and which is able, like the common compass, to point out the direction of the meridian.

By an analogous combination of metal wires, I have obtained motions, corresponding to those of the dipping-needle; and it has been for me to perceive that magnets and voltaic conductors assume, by the action of the earth, precisely those positions which electric currents would tend to give them if directed according to the apparent motion of the sun, perpendicularly to the magnetic meridians, and more intense in proportion as they should be near the equator; it suffices for this to attribute to these currents the same mode of action as is deduced relatively to magnets from the experiments of M. Oersted, and relatively to conductors from those which I have made on their mutual action. Such is, in fact, in

my opinion, the cause of the constant directions of the magnets or conducting-wires of our apparatus; but if the directing force of the terrestrial globe is produced by such currents, is it not natural to admit that the action exercised by a magnet, either on a voltaic conductor, or on another magnet, is likewise owing to electric currents situated in planes, perpendicular to its axis, [and directed relatively to its poles, as the apparent motion of the sun is relatively to the poles of the earth, corresponding to those of the magnet?

Thus we are enabled to represent by a single force, always directed according to the right line which joins the two points between which it acts, not only the magnetic phenomena formerly known, but also all the circumstances of the action of a voltaic conductor upon a magnet, discovered by M. Oersted; and of that which I have found between two conductors, which seems to me to be a strong confirmation of the opinion I delivered at the time of my first researches into the subject, respecting the identity of electricity and magnetism. The results of the experiments which I have since made appear to me, to render it more and more probable.

I shall not enter here upon the details of those experiments, I will merely add, that according to the manner in which I conceive that electricity produces all the phenomena of magnetism, a brass wire partly inclosed in a glass tube, and partly winding externally round this tube, in a spiral form, is attracted and repelled by a magnet, and acts upon it, under all circumstances, as another magnet would do, as soon as electric currents are formed round the tube, by making the two extremities of the wire communicate with those of a voltaic pile.

The effects vhich are observed by the aid of this instrument, furnish direct and multiplied proofs of the tity of electricity and magnetism. One of the prin-

cipal consequences founded upon this theory, is, that the directing action of the earth does not emanate either from the polar regions or from the centre of the globe, as has been successively supposed; but that it proceeds especially from the equatorial zone, where heat and light act with most intensity. I think that this determination of the regions of the earth, where the cause of the directing action resides, will interest natural philosophers, who endeavour to represent by general formulas, the amounts of the declinations and inclinations of the magnetic needle from the poles to the equator.

Thus, while according to the experiments of M. Arago, the electrophorus and the Leyden phial may henceforth serve navigators as an infallible means of remagnetizing to saturation the needles of their compasses, when time or other circumstances may have weakened their virtue; I shall, perhaps, have contributed by my researches to the improvement of the magnetic formulas, which are destined to render more sure and to extend by new applications, the use of an instrument, but for which the greater part of the globe would be still unknown to us.

Fire Shield.

Mr. Ralph Buckley, of New York, has invented and obtained a patent for a *fire-shield*, which is said to be the most effectual protection of property from fire ever invented. This invention is intended to arrest the evil on the spot whence it originates, by enabling firemen to approach so near the flames, as to protect surrounding property. The fire shield is made of a metallic substance; thin, light, and impervious to heat; it is of a length and breadth sufficient to cover the whole person; it may be used in several different positions.

Review of New Publications.

Lectures on Architecture, comprising the History of the Art from the Earliest Times to the Present day; delivered at the Surrey and Russell Institutions, London, and the Philosophical Institution at Birmingham, by JAMES ELMES, 8vo. pp. 440.

THIS is a useful and valuable volume, and cannot fail to inspire the general reader, as well as the professional student, with just views concerning one of the first, and certainly, most useful of the arts.

The work is divided into eight lectures or chapters, and contains, with much instructive matter relative to architecture, a history of it from the earliest periods to the present time. Many of Mr. Elmes's observations are acute, ingenious, and convincing. Speaking of the present prospects of the progress of the arts he says:

" In these prognostics for art, I would presume to hint, that an indiscriminate patronage of ancient or foreign art is *not* the encouragement NOW required by the British school. Had the Greeks fostered alone Egyptian art, they would certainly never have become the inventors of their own pure style. The Romans, on the contrary, by their exclusive patronage of Greek architects, are known only as degenerators, instead of inventors or restorers. Nor will collecting alone the master works of ancient art, however fine, make us rank as inventors, or raise us a splendid name.

" Let it not be said of us as it was of the Romans, and recently with as much propriety of the French, that we obtain from other countries, and from other times, what we could not gain from our native genius; and

that we copy and imitate more than we adopt and invent."

Mr. Elmes is a Greecian artist in every sense of the word, but one; as might be expected, he is enthusiastic in his description of every thing Greek.

"No remains of architecture or sculpture are to be found in Greece, but what are canons of art, while Rome possesses more to corrupt the taste of the young architect, than all its excellencies can counterbalance. It is, therefore, to the rules, the forms, the proportions, the taste of the former that the attention of the student should be perpetually recalled.

"The three essential and distinct qualities in architecture, are *strength*, *grace*, and *richness*. The three orders of the Greeks possess all these requisites, and the five anomalous orders of the Romans, possess no more. The aforesaid qualities are the landmarks, the boundaries, the north and south poles of the art. The Doric displays the first mentioned quality of strength; the Ionic, the second, of grace; and the Corinthian, the third, of richness. The Corinthian is the *maximum*, uniting beautiful simplicity and florid decoration; while the Doric possesses pure simplicity, plainness and robust strength; and the Ionic is the connecting link between the two.

"Yet, in those three simple elements, what an endless variety! we no more need a new order in architecture than a new letter in our alphabet. The architect of talent will as little think of bewildering himself in search of a new order, as the illustrious discoverer of the safety lamp, who now, for the interests of science, presides over the Royal Society, would of searching after the far-famed philosopher's stone.

"Every style of architecture, to be complete, must

possess these three elementary principles, and no style requires more."

The *Origin* of the *Corinthian* CAPITAL related by Vetruvius, and so very generally, even at the present day, believed and quoted, is, Mr. Elmes thinks, as indeed do we, nothing but a splendid fable. But we cannot agee with Mr. Elmes, that "the Corinthian order is clearly derived from the architecture of Egypt;" or, at least, not for the reasons which he has assigned. The simplest and commonest things are in historical, as well as other researches, too often overlooked. Stone columns in architecture were no doubt, adopted to supersede the wooden columns or trees, with which buildings in the earlier ages of the world were formed: the trees being their chief support. Indeed a *pollard* tree, either of elm or oak, will be found at the present day a rude outline of an architectural column; the stone column is then nothing more than an elegant imitation of a tree used as a pillar, with its head as a capital; the *variety* of capitals depending upon the taste of the workman. The diminution of columns is unquestionably derived from the same source.

Mr. E. divides the historical part of his subject into eight epochs. The *first epoch* is from the creation of the world to the flood, a lapse of 1656 years. In this interval we read of Tubal Cain as an artificer in brass and silver, and of the building of the ark by Noah, &c. &c.—This epoch includes also the period from the erection of the Tower of Babel to the founding of Athens by Cecrops, A. C. 1556; and to the founding of Troy by Scamander about the same date; at which period Moses and Aaron lived, and Cadmus is said to have invented letters.

The *second epoch* is from the founding of Athens by Cecrops, to Pericles. About this time, between 400 and

500 years before Christ, lived Phidias and his eminent associates; in Italy, Coriolanus, Cincinnatus, and Camillus; among the Jews, Ezra, the scribe; in Persia, Artaxerxes, Longimanus; in China, Confucius. About this time also, the architecture of Egypt met with a final blow from the devastations of Cambyses.

The *third epoch* is from Pericles and Phidias to Alexander the Great, Lysippus, Dinocrates, and their contemporaries.

The *fourth epoch* is from Alexander the Great, &c. to Hadrian and Apollodorus.]

The *fifth epoch* is from Hadrian to Theodoric, called the Goth.

The *sixth epoch* is from Theodoric to the rebuilding of St. Peter's at Rome, and the period of Leo X.

The *seventh epoch* is from Leo X. to the end of the Reign of George II.

The *eighth, or present epoch* is from the beginning of George III., under whom the revival of Greecian architecture first took place in any part of the world to the present day.

While we most heartily go along with Mr. E. and cannot avoid kindling with that glowing warmth of description, which he has thrown over the history of his beloved art; while we admit his fine tact and Greecian taste, we yet cannot avoid cautioning our readers in being led astray by an enthusiasm which has, in some instances, warped his judgment, and impelled him to wishes and conclusions, which his better and more mature reflection must disapprove.

Surely for the advantage, the encouragement and improvement of architecture, there is no occasion whatever for asking "where are our memorials of our late splendid naval and military victories?" Nor need Mr. E. have

said that "our government is surely culpable in the want of instances of monumental gratitude to the great warriors, statesmen, and orators who have embellished their days. Our Trafalgar monument, our Wellington trophy, our public mansion to the memory of the hero of the Nile, or palace to the hero of Waterloo, are like tales told by an idiot, full of sound and signifying nothing."

Does not Mr. E. know that there are very different opinions entertained in this country, even now, as to the splendour of these victories? And is Mr. E. quite sure that some *future* historian may not apply to this country, what he has himself applied to the Romans? pages 295, and 296.

On this subject we recommend to Mr. E. and our readers the contemplation of the present state of public opinion, relative to the MONUMENT on Fish Street Hill; that gorgeous and useless memorial, which,

"*Like a tall bully, lifts its head and lies.*"

An Account of a New Process in Painting, in two Parts. Part I. containing Remarks on its general correspondence with the peculiarities of the Venetian School. Part II. supplementary details explanatory of the Process; with miscellaneous Observations on the Arts of the Sixteenth Century. 8vo. pp. 186.

THIS work is, we are informed, the production of a lady, an amateur in the chaming and delightful art of painting. It does honour to her sex, and will, we are quite sure, be read with interest by every lover of the fine arts.

The account of the new process is in substance as follows:

The slight accident of spilling some wax on a crayon drawing sketched on the back of a book *bound in rough calf leather*, first led the author to engage in a train of experiments, the result of which is here offered to the public. On attempting to scrape off the wax a glaze was produced which exhibited the colouring, with that peculiarity of texture and surface, which so generally distinguishes works of the old masters. It also gave a depth and mellowness of tone rarely found in modern painting; and served, at once, to show all the brilliant effects that might be obtained, if the art of glazing crayons could be brought to a regular process. After devoting the entire leisure of the last seven years to the making of experiments on this subject, the fair authoress informs us that she has, at length, succeeded in bringing to a regular process a system of *dry colouring*, which besides its external resemblance to the Venetian manner, bears such a close correspondence with all that distinguishes that school from every other known mode of painting. Many pictures have been painted on this plan, but as their specimens are wholly unfitted for public view, they are necessarily reserved for the private inspection of artists and amateurs. On this subject we cannot but regret that notice is not given when these specimens may be seen.

The choice of *rough calf leather* for a ground as above stated, it appears was made merely in consequence of the absence of other materials for the purpose. The accidental selection of this material was singularly propitious. The rich brown shade of the ground naturally induced the artist to sketch in the figure with *light* and *middle tints* only, leaving the ground for the shadows. The effect was strikingly pleasing and harmonious, and gave rise to one of the most important principles of this process: namely, to paint *light* upon shade and *only*

light. In fact to imitate nature, as nature is made visible, *and paint like the sun*—a system peculiarly, if not exclusively, applicable to crayon painting. The rough calf leather imbibed the colour with a degree of freedom and strength never before seen on crayon painting; after, however, spoiling by various experiments all the rough calf binding which fell in her way, she looked out for some new material; and fixed at last upon cotton cloths as being superior to linen; adopting common calico as a ground, the best adapted for general purpose. The trials upon *black* calico producing forcible effects, the light on this ground completely confirmed the artist in her new system of light and shade. Instead of pouring wax fortuitously on the surface, it was applied to the back of the picture, and then melted into the body of colour by holding it to the fire; but this method did not succeed. After trying various other binders, gum arabic was fixed upon, or isinglass dissolved in water, which, on being applied to the back of the picture, fixed the crayons perfectly without altering or disturbing the colour; but a sort of coarse woolliness of the surface in the common calico producing, occasionally, much inconvenience, to give a better *grain*, it was stiffened with a little gum water before the painting was begun, which finally suggested the simple mode adopted in the first stage of the painting; that of merely wetting the back of the picture with water, which dissolving the gum, fixes the crayons immediately.

It is known that in the manufacture of *white* crayons, flake white (carbonate of lead) is cautiously excluded, as it infallibly turns black or grey on exposure to the air. In varnishing crayons by the above process, the artist found that the painting darkened and became nearly invisible: but it was observed that certain colours,

Here ended all difficulties. If disappointed in the effect of the picture after it is fully brought out by the varnish, it may at all times be retouched, and the colouring be revived with increased brilliancy. It may, however, be easily conceived that the *last layer of colour* is much more liable to injury than the first, which, being interwoven with the very threads of the cloth, *will never crack or separate from its ground;* and, from the variety of binders admissible in the early stages of the process, *the colour is so firmly incorporated, as to resist the most powerful solvents.*

These processes were conducted on dark grounds, but the low tone of a picture painted on this plan does not generally please; they may be, therefore, occasionally varied, by preferring the ground of a middle tint, on which the figures should be carefully designed, and the picture shaded to its full strength with pure water colours, so as to leave the whole subject indistinctly visible, as in a sort of twilight. Thus prepared, the local colours are to be lighted up with the bright free touches of the crayon, finally retouching the whole with oil colour, where the light requires more force or sharpness, and afterwards let it be scumbled or glazed, as the tone of colouring requires.

The process now unites the powers and facilities of crayon, water-colour, and oil painting. By a judicious application of these varied resources, a perfect imitation of all that distinguishes the old from the modern school of painting, will be found attainable; and it is in this comprehensive form, not as has been erroneously imagined by any single process of crayon painting, that the process is recommended to be practically adopted.

After giving this copious abstract of the origin and outlines of the *new process in painting*, we must refer the

reader for further details, and practical operations of it, to the tract itself. These details are highly deserving the attention of crayon painters.

Of the directions for the *imitations of the old masters*, except as far as merely concerns the *permanency of the colouring*, we are more than disposed to doubt the utility. To fix on any painter either old or modern, for a "*guide and model*," is, and ever must be injurious to the progress of this enchanting art. Surely our *living* models are the models to which every painter ought incessantly to direct his attention: while we are *copyists* not from nature, but from copyists, and every painter, even the best, is but a copyist, we shall never attain that excellence to which it ought to be the object of every artist to aspire. We are sorry to differ on this subject, especially as the opinion to which we are opposed, is that of a lady; our duty as reviewers must be our excuse. But whilst we express our difference, we at the same time most cordially recommend this tract in every other respect to the favourable notice of our readers.

Time's Telescope for 1822*; or, a Complete Guide to the Almanack; containing an explanation of Saints' days and holidays, with illustrations of British History and Antiquities; Notices of Obsolete Rites and Customs; and Sketches of Comparative chronology, and Contemporary Biography. Astronomical Occurrences in every Month; comprising Remarks on the Phenomena of the Celestial Bodies, and the Naturalists' Diary, explaining the various appearances in the animal and vegetable kingdoms; to which are prefixed Outlines of Conchology.* 12mo. pp. 384.

Although we profess in our review to notice only those

works which relate to the arts and sciences, yet we have not adopted so rigid a determination as, in no instance, to depart from a rule by which we are in general guided, especially when a volume is laid before us possessed of so many agreeables as the present unquestionably is. The various pictures both prosaic and poetical, with which Time's Telescope abounds, will, we are sure, contribute to the amusement, and we trust and believe, also to the instruction of the *artist* who is a genuine worshipper of that goddess NATURE, from which the best of *his* pictures must unquestionably be formed. The poetical selections are made with much taste and do credit to the refined judgment of the Editor. In truth, we have rarely met with a more delightful and amusing volume.

This publication is an annual one; the present is the *ninth* from its commencement in 1814. The series is, of course, becoming every year more valuable. In the former volumes will be found as INTRODUCTORY MATTER, *a Popular view of the Solar System—the Principles of Astronomy—the Elements of Botany—the Principles of Zoology—Outlines of Geology and Mineralogy—a Compendium of Chemistry, and Outlines of Entomology.* We scarcely know a work which can be put into the hands of the rising generation with more advantage to their morals, and the inculcation of a just taste for the beauties of nature, and for the unadulterated pleasures which nature and the country always inspire.

"God made the country and man made the Town."

COWPER.

Polytechnic and Scientific Intelligence.

New Bank of England Note.

THE darkness in which the Bank Directors have thought proper to veil their proceedings as to the production of a new description of BANK NOTE, must be our apology for having said that which now appears to have been, in some degree, incorrect. The circumstance of not producing a New Bank Note after the repeated promises of the Directors would, in itself, afford a sufficient presumption of their experiments having failed. This, however, does not turn out to be the fact. A newly designed note has been produced by means of the machinery of Messrs. Applegarth and Cowper, the character of which appears to us as affording the most satisfactory pledge of preventing forgery.

This Note, indeed differently designed Notes, of One Pound and Five Pounds, were perfected, and several millions of them actually printed, with the professed intention of being circulated; but the Bank Directors found, that, by the employment of ARTISTS OF THE FIRST TALENT, in the course of SEVERAL MONTHS, these notes might be imitated with sufficient success to deceive a great portion of the public.—Could any reasonable man expect otherwise? Is it possible that the Bank Directors ever supposed that they could obtain a note which would be perfectly inimitable? as well might we hope to realise a perpetual motion, or to avoid gravitation, as to think of producing by man, that which man could not again effect.

Certainly, no such pledge as inimitability could be

made by one party, or expected by the other. Upon this subject, when we ventured our opinion, it was simply, that a note should be adopted, presenting such difficulties of execution, as would prevent forgery, by placing imitation altogether out of the reach of the lowest class of engravers; considering that no artist of superior talent could be induced to sacrifice so great a portion of time, as would be necessary to copy, with tolerable success, a note containing beautiful designs, and exquisite workmanship.

The new notes in question, with which (and the machinery that produced them) we have lately had opportunities of becoming intimately acquainted, are composed of vignettes and writing, upon a ground of curiously designed scroll-work, or engine-turning; which, in the manner of letter-press, are printed from the surfaces of stereotype plates; consequently every plate may, by that means, be made identical. As a farther security, by way of combining the greatest difficulties of imitation, of which the subject would admit, various colours were introduced in the printing; not of the kind, or by the means of compound plates, as proposed by Sir W. Congreve; (see Vol. I. of this Journal, page 241,) but by several impressions, and a very curious and perfect mode of registering, which not only produced the note in several colours, but gave the counter-impression of the whole identically at the back.

Such also is the facility with which these notes are produced, by the machinery erected in the Bank of England, by Messrs. Applegarth and Cowper, that several millions of individual notes, and all identical, may be daily printed, in a diversity of colours, as above described, with their progressive numbers and signatures; which is the accomplishment of a work never before effected, or, we

believe, anticipated, at the commencement of the experiments, even by the inventors themselves.

What then, it may be asked, is the cause, that the public are without the benefit of such expensive and elaborate performances; and why are the feelings of humanity still harrowed up, by the almost daily repetition of executions for the commission of an offence, to which the idle and depraved are most wantonly tempted? This is no less mysterious than lamentable; and we really believe, that the simple cause is this: those honourable gentlemen who direct the internal movements of the Bank, actuated with the best feeling upon the subject, are so extremely sensible upon the point of responsibility, that they fear to approve any plan, however promising, lest, in effect, it should be found to fall short of PERFECT SECURITY.

We, however, trust, that the plans are not altogether abandoned; conceiving that even an approximation to security, such as this, would be received by the public with the warmest feeling of approbation; and we anticipate that, at no very distant period, we shall be permitted to place before our readers such specimens of this production, as will enable them to pass their own judgment upon our opinion.

Society of Arts.

THIS society commenced their sessions, for the present season, on Wednesday the 7th instant, but have not yet adjudged rewards to any candidates. The respective committees of the society have been occupied in the investigation of many inventions, the results of which we shall notice in our next number.

Royal Society.

On Thursday, November 8th, this Society held its first meeting for the season. It was very numerously attended. A paper by Sir Everard Home on the structure of the eye was read.

The *Second Part* of the Philosophical Transactions of this Society for 1821, has just been published: it consists of the following papers:—

An Account of Experiments to determine the Times of the Vibration of the Pendulum in different latitudes. By Capt. E. SABINE.

Some Observations and Experiments on the Papyri, found in the Ruins of Herculaneum. By Sir HUMPHRY DAVY, Bart.

Observations on Napthaline, a peculiar substance resembling a concrete essential oil, which is apparently produced during the decomposition of Coal Tar. By J. KIDD, M. D.

We mentioned this substance, to which Dr. Kidd proposes to give the name of *Napthaline,* in our first volume, page 142.

On the Aberrations of Compound Lenses and Object Glasses. By J. F. W. HERSCHELL, Esq.

An Account of the Skeletons of the Dugong, two-horned Rhinoceros, and a Tapir of Sumatra. By Sir EVERARD HOME, Bart.

Sir E. Home informs us, that while this paper was printing, he went to the Missionary Society House in the Old Jewry, and inspected the horns of a double-horned Rhinoceros, brought from the interior of Africa, by Mr. Campbell. As far as it respects the appearance of the horns, it is entirely a new species. The lowest horn stands upon a projection, at the end of the nasal bones, with its base nearly horizontal, pointing forwards, and a

little upwards. It is a yard long, very small at the point, and two feet in circumference, at the base. The small horn is close to it, and stands perpendicularly behind the base of the long one; this is only twelve inches high, while the circumference of its base is equal to the larger horn. There can be no doubt of this being the animal that has given rise to the various reports of the true unicorn having been at last discovered in Africa.

On the mean Density of the Earth. By Dr. CHARLES HUTTON.

From a history and detail of various experiments, Dr. Hutton thinks it highly probable, that the earth's mean density, is very nearly five times the density of water; but not higher.

On the Separation of Iron from other Metals. By J. F. W. HERSCHELL, Esq.

On the Re-establishment of a Canal, in the place of a portion of the Urethra, which had been destroyed. By HENRY EARL, Esq.

This paper is highly deserving the attention of the anatomist and surgeon.

Calculations of some Observations of the Solar Eclipse, on the 7th of September, 1820. By Mr. CHARLES RUMKER.

An Account of the Re-measurement of the Cube, Cylinder, and Sphere, used by the late Sir GEORGE SHUCKBURGH EVELYN, *in his Enquiries respecting a Standard of Weights and Measures.* By Capt. H. KATER.

An Account of Observations made with the eight-feet Astronomical Circle, at the Observatory, Dublin, since the beginning of the year 1818, *for investigating the Effects of Parallax and Aberration on the places of certain fixed Stars, &c.* By the Rev. JOHN BRINKLEY, D.D.

On the Effects produced in the Rates of Chronometers, by the Proximity of Masses of Iron. By PETER BARLOW, Esq.

The experiments detailed in this paper are extremely valuable, but are not susceptible of abridgement, so as to suit our pages. The *first* general conclusion which Mr. Barlow draws from them is—

That the Rate of a Chronometer is undoubtedly altered by its proximity to iron bodies.

Secondly,—That it is by no means a general case, that Iron necessarily accelerates the Rate of a Chronometer.

As a practical conclusion, it is obvious, that on shipboard, great care ought to be taken to keep the chronometers out of the immediate vicinity of any considerable mass or surface of iron; on which account, they ought not to be kept in the cabins of the gun-room-officers, which are on the sides of the vessel; and, probably, a strong iron knee, or even a gun, will be found, at a very inconsiderable distance from the spot, where the watch is most likely, in this case, to be deposited.

In short, it appears from the preceding experiments, that a chronometer ought to be kept as carefully at a distance from masses of iron, as the compass itself.

On the Peculiarities that distinguish the Manatee of the West Indies, from the Dugong, of the East Indian Seas. By Sir E. HOME, Bart.

On a new Compound of Chlorine and Carbon. By R. PHILLIPS and M. FARADAY.

On the Nerves; giving an account of some Experiments on their Structure and Functions, which lead to a new Arrangement of the System. By CHARLES BELL, Esq.

This is a highly interesting and valuable paper. The explanatory engraving which accompanies it, exhibiting

the nerves of the head and neck, and their exit from their several foramina, is executed in the first style of art, and will be examined and studied with intense interest.

Further Researches on the Magnetic Phænomena, produced by Electricity; with some new Experiments on the properties of electrified Bodies, in their relations to Conducting Power and Temperature. By Sir HUMPHRY DAVY, Bart.

The most remarkable general result which Sir Humphry obtained by these researches is, *that the conducting power of metallic bodies varies with the temperature, and is lower in some inverse ratio, as the temperature is higher.* Thus, a wire of platinum $\frac{1}{220}$, and three inches in length, when kept cool by oil, discharged the electricity of two batteries, or of twenty double plates; but when suffered to be heated, by exposure in the air, it barely discharged one battery. Whether the heat was occasioned by the electricity, or applied it to from some other source, the effect was the same.

New Patents Sealed in 1821.

William Webster, of George-court, Princes-street, Soho, London, Gun-maker, for certain improvements in the mechanism of, and appertaining to, Forsyth's Roller Magazine; and for the discharge of fowling-pieces and fire-arms in general, by means of percussion.—Sealed, September 14th.—Two months for Inrolment.

James Gladston, of Liverpool, Lancaster, iron-master, for his method of increasing the strength of timber.—Sealed, September 2d.—Six months for Inrolment.

Sir William Congreve, of Cecil-street, Strand, Middlesex, Bart., for certain improvements on his former patent, bearing date October 19, 1818, for certain new methods

of constructing steam-engines.—Sealed, September 21st. —Six months for Inrolment.

James Fergusson, of Newman-street, Oxford-street, Middlesex, Stereotyper and Printer, for improvements upon, additions to, or substitutes for, certain materials or apparatus made use of in the process of printing from stereotype-plates.—Sealed, October 18th.—Two months for Inrolment.

Stephen Hawkins, of the Strand, Middlesex, Civil Engineer, for certain improvements on air-traps for privies, water-closets, close-stools, and chamber conveniencies, to which the same may be applicable.—Sealed, October 18th.—Two months for Inrolment.

Thomas Lees, the younger, of Birmingham, Warwickshire, Snuffer-manufacturer; for certain improvements in the construction of snuffers.—Sealed, October 18th.—Two months for Inrolment.

Peter Davey, of Old Swan Wharf, Chelsea, Middlesex, Coal-merchant, for an improved preparation of coal for fuel.—Sealed, October 18th.—Four months for Inrolment.

John Poole, of Sheffield, Yorkshire, Victualler, for certain improvements in plating iron or steel with brass or copper, or copper alloyed with other metal or metals, both plain and ornamental, for the purpose of rolling and working into plates, sheets, or bars, and such goods or wares to which the same may be found applicable.—Sealed, October 18th.—Six months for Inrolment.

John Christophers, of New Broad-street, London, for certain improvements on, or a substitute or substitutes for, anchors.—Sealed, October 18th.—Six months for Inrolment.

Owen Griffith, of Tryfan, Carnarvonshire, Gentleman, for an improvement in the principle and construc-

tion of manufacturing or making trusses for the cure of ruptures or hernia, in whatsoever part or parts of the body it may be situated.--Sealed, October 18th.—Two months for Inrolment.

Franz Anton Egells, of Britannia Terrace, City Road, Middlesex, Engineer, for an invention of certain improvements on steam-engines.—Sealed, November 9th. —Six months for Inrolment.

James Gardner, of Banbury, Oxford, Ironmonger, for an invention of a machine to cut fat, and other articles of a like nature, preparatory to melting, in the manufacture of tallow, soap, and candles, and which machine may be used for other similar purposes.—Sealed, November 9th.—Two months for Inrolment.

David Redmund, of Agnes Circus, Old-street-road, Middlesex, Engineer, for the invention of an improvement in the construction or manufacture of hinges for doors.—Sealed, November 9th.—Six months for Inrolment.

Richard Wright, of Mount-row, Kent-road, Surrey, Engineer, for an invention of certain improvements in the process of distillation.—Sealed, November 9th.—Six months for Inrolment.

Edward Bowles Symes, of Lincoln's-inn, Middlesex, Esquire, for the invention of an expanding hydrostatic piston, to resist the pressure of certain fluids, and to slide easily in an imperfect cylinder.—Sealed, November 10th.—Six months for Inrolment.

William Westley Richards, of Birmingham, Warwick, Gun-Maker, for the invention of an improvement in the construction of gun and pistol locks.—Sealed, November 10th.—Two months for Inrolment.

William Penrose, of Summergangs, York, Miller, for the invention of various improvements in the machinery for propelling vessels, and also various improve-

ments in vessels so propelled.—Sealed, November 10th.—Six months for Inrolment.

Joseph Grout, of Gutter-lane, Cheapside, London, Crape Manufacturer, for an invention of a new manufacture of crape.—Sealed, November 13th.—Six months for Inrolment.

Neil Arnott, of Bedford-square, Middlesex, Doctor in Medicine, for improvements connected with the production and agency of heat, in furnaces, steam and air engines, distilling, evaporating, and brewing apparatus.—Sealed, November 14th.—Six months for Inrolment.

Richard Macnamara, Esq. of Canterbury-Buildings, Lambeth, Surrey, for the invention of an improvement in paving, pitching, and covering streets, roads, and other places.—Sealed, November 20th.—Six months for Inrolment.

Thomas Parkin, of Skinner-street, Bishopsgate-street, London, merchant, for the invention of an improvement or improvements in printing.—Sealed, November 24th.—Six months for Inrolment.

Thomas Motley, of the Strand, Middlesex, Patent Letter Maker and Brass Founder, for certain improvements in the construction of candlesticks or lamps, and in candles to be burnt therein.—Sealed, November 27th.—Six months for Inrolment.

William Baylis, junior, of Painswick, Gloucester, Clothier, for a machine for washing and cleansing cloths.—Sealed, Nov. 28th.—Two months for Inrolment.

TO CORRESPONDENTS.

We feel greatly obliged by the very handsome letter of Dr. W. and shall be most happy in receiving his promised favour; his present communication is unavoidably postponed till our next Number.—Mr. A.— Mr. C.— and Mr. S.— will perceive that we have made free with their communications.—Mr. D.—'s invention was too late for the present Number.—We hope that J. N. will fulfil his pledge at no very distant period.—We beg to inform the anonymous correspondent at Hereford that, not having yet had the opportunity of acquiring an experimental *knowledge of the invention to which he alludes, we are unable to answer his queries; but if he will favour us with his address we will shortly inform ourselves, and make a private communication.*

Mr. G.'s letter, containing his literary notice for this Journal, has been received, but though we have no disposition to question that "gentleman's extensive knowledge and connections," *we decline appropriating our pages to the quackery and puffs of trading book-makers.*

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